



WORLDWIDE EQUIPMENT GUIDE



TRADOC DCSINT Threat Support Directorate
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Introduction

This Worldwide Equipment Guide (WEG) serves as an interim guide for use in training, simulations, and modeling until the publication of FM 100-65, *Capabilities-Based Opposing Force: Worldwide Equipment Guide*. The WEG is designed for use with the FM 100-60 series of capabilities-based opposing force field manuals. It provides the basic characteristics of selected equipment and weapons systems readily available to the capabilities-based OPFOR, and generally listed in either *FM 100-61, Armor- and Mechanized-Based Opposing Force: Organization Guide* or *FM 100-63, Infantry-Based Opposing Force: Organization Guide*. Selected weapons systems and equipment are included in the categories of infantry weapons, infantry vehicles, reconnaissance vehicles, tanks/assault vehicles, antitank, artillery, air defense, engineer and logistic systems, and rotary-wing aircraft.

The pages in this WEG are designed for insertion into loose-leaf notebooks. Since this guide does not include all possible OPFOR systems identified in the OPFOR field manuals, equipment sheets covering additional systems not contained in this initial issue will be published periodically. Systems selected will be keyed directly to the baseline equipment contained in the 100-60 series and substitute systems found in the appropriate substitution matrix. The WEG is scheduled for eventual publication on the worldwide web for use by authorized government organizations.

WORLDWIDE OPFOR EQUIPMENT

Due to the proliferation of weapons through sales and resale, wartime capture, and licensed or unlicensed production of major end items, distinctions between equipment as friendly or OPFOR have blurred. Sales of upgrade equipment and kits for application to weapon systems have further blurred distinctions between old or obsolete systems and modern systems. This WEG describes base models listed in the FMs or upgrades of those base models, which reflect current capabilities. Many less common variants and upgrades are also addressed.

HOW TO USE THIS GUIDE

The WEG is organized by categories of equipment, in chapters. The format of the equipment pages is basically a listing of parametric data. This permits updating on a standardized basis as data becomes available. For meanings of acronyms and terms, see the Glossary. Please note that although most terms are the same as U.S. terminology, some reflect non-U.S. concepts and are not comparable or measurable against U.S. standards. For example, if an OPFOR armor penetration figure does not say RHA (rolled homogeneous armor), do not assume that is the standard for the figure. Please consult the Glossary often. If questions remain, contact this office.

Worldwide Equipment Guide

System names refer back to the field manuals. However, they also reflect intelligence community changes in naming methods. Alternative Designations include the manufacturer's name, as well as U.S./NATO designators. Note also that the WEG focuses on the complete weapon system (e.g., AT-4/5 antitank guided missile launcher or 9P148 ATGM launcher vehicle), versus a component or munition (9P135 launcher assembly or AT-4/5 ATGM).

Common and consistent technical notes and parameters are used in chapters 2 through 7, since the systems contained in those chapters have similar weapon and automotive technologies. Chapters 1 (Infantry Weapons), 8 (Engineer and Logistics) and 9 (Rotary-wing Aircraft) offer systems that have many unique parameters and therefore may not be consistent with those in other chapters.

We solicit your assistance in finding unclassified information which can be certified for use. Questions and comments on systems data should be addressed to the authors noted for each chapter. For questions concerning distribution to U.S. government organizations, please contact the local publications clerk, and:

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Units of Measure

The following symbols and abbreviations are used in this guide.

<u>Unit of Measure</u>	<u>Parameter</u>
(°)	degrees of slope/gradient, elevation, traverse
cal	caliber—(tube length in multiples of cannon bore)
GHz	gigahertz—frequency (GHz = 1 billion hertz)
hp	horsepower (kWx1.341 = hp)
Hz	hertz—unit of frequency
kg	kilogram(s) (2.2 lb.)
kg/cm ²	kg per square centimeter—pressure
km	kilometer(s)
km/h	km per hour
kW	kilowatt(s) (1 kW = 1,000 watts)
liters	liters—liquid measurement (1 gal. = 3.785 liters)
m	meter(s)—if over 1 meter use meters; if under use mm
m ³	cubic meter(s)
m ³ /hr	cubic meters per hour—earth moving capacity
m/hr	meters per hour—operating speed (earth moving)
MHz	megahertz—frequency (MHz = 1 million hertz)
min	minute(s)
mm	millimeter(s)
m/s	meters per second—velocity
mt	metric ton(s) (mt = 1,000 kg)
rd/min	rounds per minute—rate of fire
RHAe	rolled homogeneous armor (equivalent)
shp	shaft horsepower—helicopter engines (kWx1.341 = shp)
µm	micron/micrometer—wavelength for lasers, etc.

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Chapter 1 Infantry Weapons

This chapter provides the basic characteristics of selected infantry weapons either in use or readily available to the OPFOR and therefore likely to be encountered by U.S. forces in varying levels of conflict. The selection of weapons is not intended to be all inclusive, rather a representative sampling of weapons and equipment supporting various military capabilities.

This chapter is divided into two categories—*small arms* and *recoilless weapons*. *Small arms* covers, in order, assault rifles, under-barrel grenade launchers, light machineguns, general purpose machineguns, heavy machineguns, and automatic grenade launchers. The second category, *recoilless weapons*, contains the US 106-mm Recoilless Rifle M40 and the Russian 73-mm Recoilless Gun SPG-9. This category also covers a rapidly growing segment of shoulder-fired (unguided) infantry weapons. While originally limited to shoulder-fired unguided antitank weapons such as the Russian 40-mm Antitank Grenade Launcher RPG-7, the utility of shoulder-fired weapons has expanded to include multi-purpose systems such as the Swedish 84-mm Recoilless Rifle Carl Gustaf M2. This field of weapons is often labeled “antitank” and also includes “bunker-buster” warheads, and weapons fired from close spaces such as the German 67-mm Disposable Antitank Grenade Launcher Armbrust.

Another emerging battle-tested, lethal, shoulder-fired weapon is the Russian Infantry Rocket Flame Weapon RPO-A Series (RPO-A/D/Z) capable of firing either a smoke, incendiary, or a thermobaric warhead to 600 meters. At 200 meters it is accurate to 0.5 m². The thermobaric warhead has a demolition effect corresponding to a round of 122-mm HE artillery. Due to the relative low cost, availability, versatility, transportability, trainability, and lethality of this category of infantry weapons, trainers should expect to encounter these systems in larger numbers with increasing levels of lethality, penetration, and utility. For information on guided antitank weapon systems see Chapter 5.

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Russian 5.45-mm Assault Rifle AK-74

	<p>Ammunition Types</p> <p>5.45-mm cartridge Ball Ball-tracer Incendiary-T AP</p>	<p>Typical Combat Load</p> <p>300</p>
<p>SYSTEM</p> <p>Alternative Designations: INA Date of Introduction: 1974 Proliferation: Widespread</p> <p>Description: Weight (kg): Loaded (with magazine): 3.95 Empty (w/o magazine): 3.4 Length (mm): Overall: 880 (937 including muzzle brake) Barrel: 415 Rate of Fire (rd/min): Cyclic: 600 Practical: Automatic: 100 Semiautomatic: 40 Operation: Gas Feed: 30-rd detachable box magazine (40-rd used by RPK-74 LMG is interchangeable) Fire Mode: Selective, automatic or semi-automatic</p> <p>SIGHTS</p> <p>Name: INA Type: Fore, pillar; rear, U-notch Magnification: None Night Sights Available: Yes. AK-74M N3 mounts an NSPU-3</p>	<p>VARIANTS</p> <p>AKS-74: Folding-stock version with a Y-shaped, tubular stock. AK-74M: Improves the basic AK-74 design by adding a folding plastic stock, an improved mount for night vision or other sights. AKS-74U: Submachinegun: modified version with a much shorter barrel (207-mm) and a conical flash suppressor instead of a muzzle break. Its overall length is 492 with stock folded. AK-101: 5.56x45-mm (NATO) variant of the AK-74M. AK-102: 5.56x45-mm (NATO) short-barrel (314-mm) variant of the AK-74M. AK-103: 7.62x39-mm variant of the AK-74M. AK-104: 7.62x39-mm short-barrel (314-mm) variant of the AK-74M. AK-105: 5.45x39-mm short-barrel (314-mm) variant of the AK-74M.</p> <p>AMMUNITION</p> <p>Name: 7N6 Caliber/length: 5.45x39-mm Type: Ball Range (m): Effective: 500 Maximum: 800 Armor Penetration: INA Muzzle Velocity (m/s): 880</p> <p>Name: 7N10 Caliber/length: 5.45x39-mm Type: Armor piercing Range (m): Effective: INA for AK-74 (800 for RPK-74) Armor Penetration (mm): 16 @ 100 m 80% of time Muzzle Velocity (m/s): INA for AK-74 (960 for RPK-74)</p>	

NOTES

The AK-74 is basically an AKM rechambered and rebored to fire a 5.45-mm cartridge. The AK-74 can mount a 40-mm under-barrel grenade launcher and a passive image intensifier night sight. The AK-74 is also the basis for other 5.45-mm infantry weapons including the RPK-74 light machinegun.

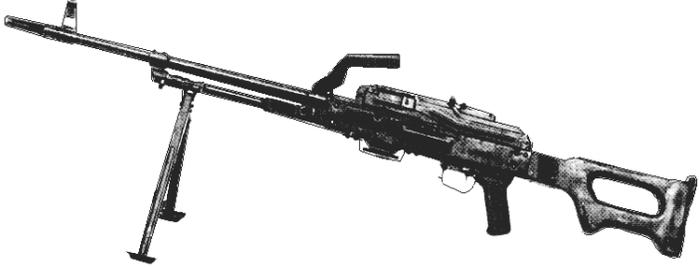
Russian 5.45-mm Light Machinegun RPK-74

	<p>Ammunition Types</p> <p>5.45-mm cartridge Ball Ball-tracer Incendiary-T AP</p>	<p>Typical Combat Load</p> <p>320</p>
<p>SYSTEM</p> <p>Alternative Designations: INA Date of Introduction: Late 1970s Proliferation: Widespread</p> <p>Description: Weight (kg): Loaded (with magazine): 5.0 Empty (w/o magazine): 4.6 Length (mm): Overall: 1.07 m Barrel: 590 mm (including flash suppresser) Rate of Fire (rd/min): Cyclic: 600 Practical: Automatic: 150 Semiautomatic: 50 Operation: Gas Feed: 40-rd detachable box magazine (30-rd used by AK-74 is interchangeable) Fire Mode: Selective, automatic or semi-automatic</p> <p>SIGHTS</p> <p>Name: INA Type: Fore, cylindrical post; rear, tangent leaf with U-notch; adjustable to 1,000 m Magnification: None Night Sights Available: Yes. 1LH51 night sight</p>	<p>VARIANTS</p> <p>RPKS-74: Folding stock</p> <p>AMMUNITION</p> <p>Name: 7N6 Caliber/length: 5.45x39-mm Type: Ball Range (m): Effective: 800 Maximum: 1,000 Armor Penetration: INA Muzzle Velocity (m/s): 960</p> <p>Name: 7N10 Caliber/length: 5.45x39-mm Type: AP Range (m): Effective: 800 Armor Penetration (mm): 16 @ 100 m 80% of time Muzzle Velocity (m/s): 960</p>	

NOTES

The RPK-74 is the machinegun version of the AK-74, firing the same ammunition. Instead of the prominent muzzle brake used on the AK-74, the machinegun is longer than that normally used with the AK-74, but the magazines are interchangeable. The RPK-74 has a bipod and is compatible with the front firing ports of BMPs. The RPK-74 is the standard squad machinegun in OPFOR infantry units. It generally replaces both the RPK and PKM 7.62-mm weapons.

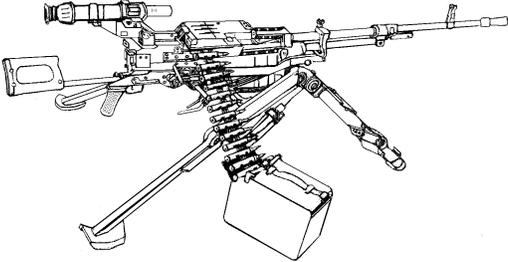
Russian 7.62-mm General Purpose Machinegun PKM

	<p>Ammunition Types</p> <p>7.62-mm cartridge Ball Ball-tracer Incendiary-ranging API API-T</p>	<p>Typical Combat Load</p> <p>INA</p>
<p>SYSTEM</p> <p>Alternative Designations: (see VARIANTS) Date of Introduction (PKM/PKT): 1971/1968 Proliferation: Widespread</p> <p>Description: Weight (kg): Empty (w/o magazine) (PKM/PKT) (kg): 8.4/10.66 Loaded (with magazine): Varies with magazine Ammo box (only) with 100/200-rd belt (kg): 3.9/8.0 Tripod (lightweight) (kg): 4.75 Length (mm): Overall (PKM/PKT): 1,160/1,080 On tripod (PKS): 1,267 Barrel: 658 Barrel Change: Yes Mount Type: Pintle, coaxial, bipod or tripod (Stepanov) Mounted On: (see VARIANTS) Rate of Fire (rd/min): Cyclic: 650 Practical: 250 Fire Mode: Automatic Operation: Gas Feed: Belt, 100-rd belt carried in a box fastened to the right side of the receiver. 25-rd belts can be joined in several combination lengths (100/200/250)</p>	<p>SIGHTS</p> <p>Name: INA Type: Open iron sights Sighting range (PKM/PKT) (m): 1,500/2,000 Magnification: None Night Sights Available: Yes</p> <p>VARIANTS</p> <p>PKM: Squad machinegun PKT: Tank-mounted coaxial, lacks stock, sights, bipod, has solenoid electric trigger, longer heavier barrel. PKS: Lightweight tripod-mounted infantry weapon PKMS: Lightweight tripod-mounted variant of the PKS PKB (PKBM): Pintle-mounted on APCs, SP guns, BRDM, BTRs, has butterfly trigger rather than solenoid, double space grips, and front and rear sights</p> <p>AMMUNITION</p> <p>Name: INA Caliber and Length: 7.62x54-mm rimmed Type: Ball Max Range (PKM/PKT) (m): 3,800/4,000 Practical Range (PKM/PKT) (m): Day: 1,000/2,000 Night: 300/INA Armor Penetration @ 0° obliquity @ 500 range (mm): 8 Muzzle Velocity (PKM/PKT) (m/s): 825/855</p>	

NOTES

The 7.62-mm general-purpose machinegun (PKM) is a gas-operated, belt-fed, sustained-fire weapon. The basic PKM is bipod-mounted but can also fit in vehicle firing ports. It is constructed partly of stamped metal and partly of forged steel. Compared to the US M-60, the PK-series machineguns are easier to handle during firing, easier to care for, and lighter. The 7.62x54R is a more powerful cartridge than the US with a slightly shorter effective range.

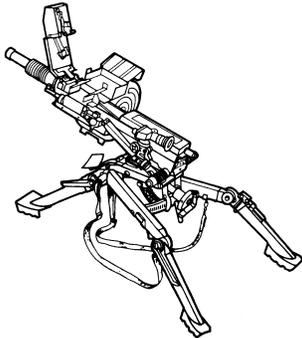
Russian 12.7-mm Heavy Machinegun NSV/NSV-T

	<p style="text-align: center;">Ammunition Types</p> <p>12.7-mm cartridge API (B-32) API-T (BZT-44) HEI</p>	<p style="text-align: center;">Typical Combat Load</p> <p style="text-align: center;">300</p>
<p>SYSTEM</p> <p>Alternative Designations: NSVS (tripod-stand mounted), Utyos Date of Introduction: Early 1970s Proliferation: Widespread</p> <p>Description: Weight (kg): Total System (w/6T7): 43 Empty: 25 Loaded: INA Tripod (6T7 tripod): 16 Length (mm): Overall: 1,560 On 6T7 Tripod: 1,900 Width (on 6T7 tripod) (mm): 860 Height (on 6T7 tripod) (mm): 380 Barrel Life (rds): 5,000 Barrel Change Time (sec): 5 Barrel Weight (kg): 9.2 Mount Type: 6T7 (infantry) tripod or 6U6 (w/seat) universal tripod Mounted On: (see VARIANTS) Traverse (°): 360 Elevation (°): -5 to +75 Rate of Fire (rd/min): Cyclic: 680-800 Practical: 100 Fire Mode: Automatic; short bursts (four to six) or long bursts (10 to 15) or continuously Operation: Gas Feed: Left or right from metal link belt from 50-rd boxes</p>	<p>SIGHTS</p> <p>Name: INA Type: Metallic sights, (tangent leaf rear and folding front post) Sight Range (m): 2,000 Name: 10P50 Optical Type: Day optical sight Magnification: 3-6x Name: 1PN52-1 Type: Night sight Magnification: 5.3x Name: 10P80 (used w/ 6U6 mount) Type: AA collimating sight (aircraft speed to 300 km/h) Name: 10P81 (used w/ 6U6 mount) Type: Ground target sight Name: K10-T (on NSVT for T-72/T-80) Type: Reflex AA sight</p> <p>VARIANTS</p> <p>NSVT: Tank-mounted, (see NOTES)</p> <p>AMMUNITION Name: B-32 Caliber and Length: 12.7x108-mm Type: Armor Piercing Incendiary Max Range (ground) (m): 7,850 Effective Range (m): AA: 1,000 Ground: 2,000 Armor: 800 Night (w/1PN52-1): 1,000 Armor Penetration @ 0° obliquity @ 500/1,000m range (mm): 20/13.2 Muzzle Velocity (m/s): 860</p>	

NOTES

A tripod-mount (6T7) version is available for infantry use in a ground role. However, the NSVT appears more commonly mounted on the turrets of tanks as an anti-aircraft machinegun. On the T-72 and the T-80, it has a rotating mount and can be fired from within the tank. The tank commander employs the K10-T reflex sight to engage aircraft. On the T-72/T-80 mount he engages ground targets with metallic sights on the gun itself. The T-64 tank mounts a modified version with a fixed mount on the commander's cupola. It fires by means of an electrical solenoid when the tank is buttoned up. An optic serves this purpose. Instead of the normal 50-round ammunition belt container, the NSVT on the T-64 may use a larger belt container holding 200 rounds.

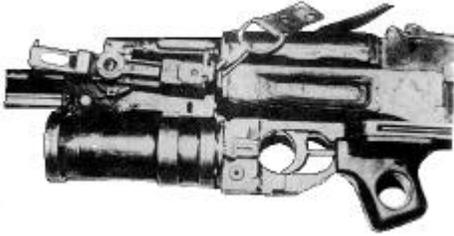
Russian 30-mm Automatic Grenade Launcher AGS-17

	<p style="text-align: center;">Ammunition Types</p> <p style="text-align: center;">30-mm grenade Frag-HE</p>	<p style="text-align: center;">Typical Combat Load (Dismounted)</p> <p style="text-align: center;">87</p>
<p>SYSTEM</p> <p>Alternative Designations: Plamya (Flame) Date of Introduction: 1974 Proliferation: At least 12 countries</p> <p>Description: Crew: 3 (see NOTES) Weight (kg): Empty (without magazine): 30.71 Loaded (with magazine): 45.05 Launcher: 17.86 Sight: .99 Tripod: 11.86 Magazine (loaded): 14.34 Length (m): 1.28 Height (m): INA Width (m): INA Tripod Name: SAG-17 Mounts: Tripod, vehicle, or helicopter Traverse (°): 30 total Elevation (°): +7 to +87 Service Life of Barrel (rds): 6,000 Barrel Change Time: Quick disconnect Rate of Fire (rd/min): Practical: 60-100 Cyclic: 100-400 Adjustable with a thumb safety. May be fired single shot or in short (≤ 5 rds) or long (6-10 rds) bursts. Operation: Blowback Feed: Drum magazine containing 29 round belt. Fire Mode: Selective, automatic and semi-automatic Loader Type: Manual</p>	<p>SIGHTS</p> <p>Name: PAG-17 Type: Illuminated day optical sight Sighting Range (m): 1,700 Magnification: 2.7x Location: Left rear of launcher Night Sights Available: Yes</p> <p>VARIANTS</p> <p>AG-17: Vehicle mounted. AG-17A: Helicopter mounted, electric trigger, rate of fire increased to 420-500 rd/min, 300 rd belt. TKB-722K AGL: Lighter version and possibly the follow-on to the AGS-17, shoots the same ammunition as the AGS-17</p> <p>AMMUNITION</p> <p>Name: VOG-17A, VOG-17M (self-destruct) Caliber/length: 30x132.8-mm Type: Frag-HE Range (m) Direct Fire Range (m): 700 Effective (m): 1,200 Min Range (m): 50 Max Indirect Range (m): 1,730 Armor Penetration: Lightly armored vehicles. Accuracy @ 400 m: Distance: 4.3 m Deflection: .2 m Casualty Radius (m): 15 (90% at 7 m) Complete Round Weight (grams): 350 Grenade Weight (grams): 280 Warhead Explosive Weight (grams): 36 Muzzle Velocity (m/s): 185 Fuze Type: Impact, activates after 25 spins.</p>	

NOTES

The AGS-17 provides the infantry with an area suppressive capability. One AGL can create a damage zone 15 meters wide. The fire from an AGL platoon covers a sector approximately 90 m across. Although primarily intended for use against personnel, it has a limited capability to engage lightly armored vehicles. The crew consists of a gunner and two riflemen-assistant gunners, and may have an additional ammunition bearer. For ground transport the AGS-17 breaks down into four parts: launcher, sight, tripod, and magazine. When dismounted the gunner carries the sight and launcher, the first assistant carries the tripod and a magazine, and the second assistant carries two additional magazines. It is very accurate in the semiautomatic mode and is quite effective in area coverage in the automatic mode. The 50-meter increments in the range table atop the receiver indicate accuracy against point targets. The AGS-17 is normally organized in a platoon consisting of 6 launchers, carried in pairs in three armored vehicles (they can also be carried in trucks, or by individuals). The AGS-17 is capable of mounting night vision sights.

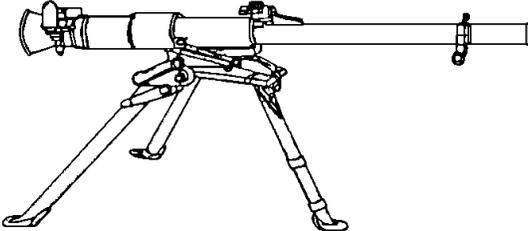
Russian 40-mm Under-Barrel Grenade Launcher GP-30

		<p style="text-align: center;">Ammunition Types</p> <p>40-mm grenade Frag-HE (impact) Frag-HE (bounding) Smoke</p>	<p style="text-align: center;">Typical Combat Load</p> <p style="text-align: center;">10</p>
<p>SYSTEM</p> <p>Alternative Designations: BG-15 Mukha; GP-25 Koster, GP-30 Obuvka Date of Introduction: 1980 Proliferation: Widespread</p> <p>Description: Weight (kg): Loaded: 1.79 Empty: 1.5 Length (mm): Overall: 323 Barrel: 205 Rate of Fire (rd/min): 4-5 Operation: N/A Feed: Muzzle-loaded Fire Mode: Single-shot Accuracy @ 400 m: Distance: 6.7 m Deflection: 3 m Components: Barrel (w/ mounting bracket and sight), trigger assembly</p> <p>SIGHTS</p> <p>Name: N/A Type: Front post and rear open U-notched Location: Left side of mounting bracket Sighting Range (m): Graduated out to 400</p> <p>VARIANTS</p> <p>BG-15, GP-25: (see NOTES)</p>	<p>AMMUNITION</p> <p>Name: VOG-25 Caliber/length: 40x102-mm Type: Frag-HE with impact fuze Weight (kg): Round: .250 Exposive: .048 Range (m): Maximum: 400 Minimum: 10–40 (arms itself) Casualty Radius (m): 6; (90% @ 10) Self-destruct Time (sec): 14–19 Muzzle Velocity (m/s): 76</p> <p>Name: VOG-25P Caliber/length: 40x122-mm Type: Bounding Frag-HE, explodes .5 to 1.5 m from impact Weight (kg): Round: .278 Exposive: .037 Range (m): Maximum: 400 Minimum: 10 – 40 (arms itself) Casualty Radius (m): 6; 90% @ 10 Self-destruct Time (sec): 14 – 19 Muzzle Velocity (m/s): 75</p> <p>Name: GRD-40 Caliber/length: 40x150-mm Type: Smoke Effective Against: Visual and infrared Weight (g): 260 Smoke Screening Range (m): 50, 100, 200 Smoke Screen Dispersion (m): 1 sec.....10x10x10 2 sec.....20x20x20 3 sec.....25x25x25 Smoke Screen Duration @ wind speed of 3-5 m/s: At least 60 sec Muzzle Velocity (m/s): 70-75</p>		

NOTES

The GP-30 Obuvka is a widely proliferated, muzzle-loaded, single-shot, detachable, under-barrel grenade launcher. The BG-15, GP-25 and the GP-30 are all basically the same weapon. Variants can be mounted on all models of Kalashnikov assault rifles. The rifleman can fire the launcher only when the complete weapon is attached to the assault rifle.

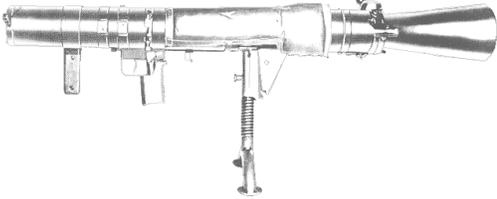
Russian 73-mm Recoilless Gun SPG-9

	<p>Ammunition Types</p> <p>73-mm recoilless gun RA HEAT RA HE</p>	<p>Typical Combat Load</p> <p>INA</p>
<p>SYSTEM</p> <p>Alternative Designations: INA Date of Introduction: 1970 Proliferation: Widespread</p> <p>Description: Crew: 3 Caliber (mm): 73 Weight (kg): Firing Position: 47.5 Travel Position: 47.5 Tripod: 12 Length (travel) (m): 2.11 Width (travel) (m): .99 Height (travel) (m): .80 Rifling: None Breech Mechanism Type: Interrupted screw Feed: Breech load Traverse (°): 30 total Elevation (°): -3 to +7 Rate of Fire (rd/min): 6 Emplacement/displacement time (min): 1 Fire From Inside Building: No</p>	<p>SIGHTS</p> <p>Name: PGO-9 Type: Optical and iron Magnification: Optical 4x, 10° field of view Location: Left side Sighting Range (m): 1,300 Night Sights Available: IR and passive night, PGN-9</p> <p>VARIANTS</p> <p>SPG-9D: Airborne version with detachable wheels</p> <p>AMMUNITION</p> <p>Range (m): Maximum Effective: HEAT: 1,000 HE: 1,300 Minimum: INA Armor Penetration (mm) @ 1,000 m: 400 (HEAT any range) Casualty Radius (m): INA Length (mm): 1,000 Complete Round Weight (kg): Rocket-Assisted HEAT: 3.5 Rocket-Assisted HE: 4 Muzzle Velocity (m/s): 435 Max Velocity w/rocket assist (m/s): 700</p>	

NOTES

The SPG-9 is a recoilless, smooth-bore, single-shot antitank weapon that fires both antiarmor and antipersonnel ammunition. Several generations of night vision equipment are available for the SPG-9. It is manportable, but a truck or APC normally carries it. It must be dismounted and placed on its tripod for firing.

Swedish 84-mm Recoilless Rifle Carl Gustaf M2

	<p style="text-align: center;">Ammunition Types</p> <p>84-mm round HEAT (tandem) HEDP HEAT HE Smoke Illumination</p>	<p style="text-align: center;">Typical Combat Load</p> <p style="text-align: center;">INA</p>
<p>SYSTEM</p> <p>Alternative Designations: INA Date of Introduction: INA Proliferation: At least 20 countries Description: Crew: 1 or 2 (see NOTES) Caliber (mm): 84 Weight (kg): Mount: .8 M2: 14.2 M3: 8.5 Length (mm): 1,065 Rifling: 24 lands/progressive twist Breech Mechanism Type: Hinged Rate of Fire (rd/min): 6 Fire From Inside Building: INA</p> <p>SIGHTS</p> <p>Name: INA Type: Iron and telescoped Magnification: 3x Location: Left side Weight (kg): 1 Used With Range Finders: Yes, laser Night Sights Available: May be used with Generation III Image Intensification Systems.</p> <p>VARIANTS M3: Lightweight version of the M2</p> <p>AMMUNITION</p> <p>Name: FFV 751 Type: HEAT (tandem) Range (m): Effective: 500 Minimum: INA Moving: INA Penetration: Armor (mm): +500 Weight (kg): 4</p>	<p>Name: FFV 502 Type: HEDP (with dual mode fuze) Range (m): Effective (personnel in open): 1,000 Effective (stationary): 500 Moving: 300 Arming Range: 15-40 Penetration: Armor (mm): +150 Weight (kg): 3.3 Muzzle Velocity (m/s): 230</p> <p>Name: FFV 551 Type: HEAT Range (m): Effective: 700 Arming Range: 5-15 Penetration: Armor (mm): 400 Weight (kg): 3.2 Muzzle Velocity (m/s): 255</p> <p>Name: FFV 441B Type: HE Range (m): Effective (unprotected troops, soft-skinned vehicles): 1,100 Arming Range: 20-70 Casualty Radius (m): INA Weight (kg): 3.1 Muzzle Velocity (m/s): 240</p> <p>Name: FFV 469B Type: Smoke Range (m): Effective: Up to 1,300 Weight (kg): 3.1 Muzzle Velocity (m/s): 240</p> <p>Name: FFV 545 Type: Illumination Range (m): Practical: 300-2,100 Burning Time (sec): 30 Illuminated Area, dia: 400-500 Candle Power: 650,000 cd Weight (kg): 3.1 Muzzle Velocity (m/s): 260</p>	

NOTES

The 84-mm Carl Gustaf recoilless rifle is a one-man portable, direct-fire, single-shot, breech-loading weapon. Several versions of the Carl Gustaf are produced outside Sweden; however, the ammunition is interchangeable among the variants. While the weapon can be operated by one person it is better to have two—one to fire the gun, and the other to carry and load the ammunition. In addition to its antitank role, the weapon can be used as part of an illumination plan, to provide smoke, or for bunker busting.

Russian 40-mm Antitank Grenade Launcher RPG-7V

	<p>Ammunition Types</p> <p>40-mm grenade PG-7V PG-7VM PG-7VS PG-7VL PG-7VR TBG-7V OG-7V OG-7VM</p>	<p>Typical Combat Load</p> <p>5</p>
<p>SYSTEM</p> <p>Alternative Designations: INA Date of Introduction: 1962 Proliferation: At least 40 countries</p> <p>Description: Crew: 2 Caliber (launcher) (mm): 40 Weight (kg): Empty: 7.9 Loaded: Varies with grenade Length (mm): 950 Rate of Fire (rd/min): 6 Fire From Inside Building: No Grenade Components: Warhead, rocket motor, tail assembly</p> <p>SIGHTS</p> <p>Name: PGO-7 Type: Optical w/II Magnification: 2.7x, 13° field of view Location: Top of launcher/sight-left side Sighting Range (m): 500 Night Sights Available: Yes, NSP-3, NSP-2 (IR), NSPU, PGN-1 (II), 1PN58 (II)</p> <p>VARIANTS RPG-7D, RPG-7DV1: Folding variants used by airborne troops</p> <p>AMMUNITION</p> <p>Name: PG-7V Caliber (mm): 85 Type: HEAT Range (m): Effective: 500 Minimum: INA Moving: 300 Penetration: Armor (mm): 330 Length (mm): INA Weight (kg): 2.2</p>	<p>Name: PG-7VM Caliber (mm): 70.5 Type: INA Range (m): Effective: 500 Minimum: INA Penetration: Armor (mm): 330 Muzzle Velocity (m/s): 140 Length (mm): 950 Weight (kg): 2</p> <p>Name: PG-7VS Caliber (mm): 72 Type: INA Range (m): Effective: 500 Minimum: INA Penetration: Armor (mm): INA Brick (m): + 1.5 Reinforced concrete (m): + 1 Casualty Radius (m): INA Muzzle Velocity (m/s): INA Length (mm): INA Weight (kg): 2</p> <p>Name: PG-7VL Caliber (mm): 93 Type: INA Range (m): Effective: 300 Minimum: INA Penetration: Armor (mm): 600 Brick (m): 1.7 Reinforced concrete (m): + 1.1 Muzzle Velocity (m/s): 112 Length (mm): 980 Weight (kg): 2.6</p>	

NOTES

The RPG-7V is a recoilless, shoulder-fired, muzzle-loaded, reloadable, antitank grenade launcher. It fires a variety of rocket-assisted grenades from a 40-mm smoothbore launcher tube. It is the standard squad antitank weapon in use by the OPFOR. The RPG-7V is light enough to be carried and fired by one person. However, an assistant grenadier normally deploys to the left of the gunner to protect him from small arms fire. The RPG-7V requires a well-trained gunner to estimate ranges and lead distances for moving targets. Crosswinds as low as 7 miles per hour can complicate the gunner's estimate and reduce first-round hit probability to 50% at ranges beyond 180 meters.

Worldwide Equipment Guide

Russian Antitank Grenade Launcher RPG-7V continued

<p>Name: PG-7VR (uses RPG-7V1 launcher sights) Caliber (mm): 105 Type: Tandem Range (m): Effective: 200 Minimum: INA Sighting Range: INA Penetration: Armor (mm): +750 (all armor including reactive armor) Brick (m): 2 Reinforced concrete (m): +1.5 Muzzle Velocity (m/s): INA Length (mm): 1,306 Weight (kg): 4.5</p> <p>Name: TBG-7V (uses RPG-7V1 launcher sights) Caliber (mm): 105 Type: Thermobaric (similar to RPO-A warhead) Range (m): Effective: 200 Sighting Range: 800 Penetration: Armor (mm): INA Brick (m): +1.5 Reinforced concrete (m): + 1.5 Casualty Radius (m): INA Muzzle Velocity (m/s): INA Length (mm): INA Weight (kg): 4.5</p>	<p>Name: OG-7V Caliber (mm): 40 Type: Frag-HE Range (m): Effective: 950 Casualty Radius (m): INA Muzzle Velocity (m/s): 152 Length (mm): 569 Weight (kg): 1.7</p> <p>Name: OG-7VM Caliber (mm): 40 Type: Frag-HE Range (m): Effective: 1,000 Casualty Radius (m): INA Muzzle Velocity (m/s): 145 Length (mm): 595 Weight (kg): 1.7</p>
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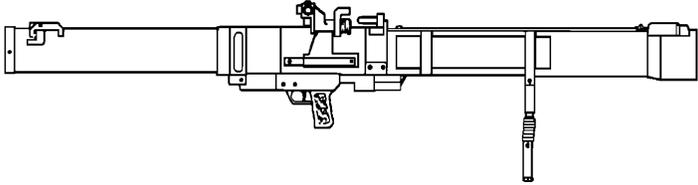
German 60-mm Antitank Grenade Launcher Panzerfaust-3

	<p style="text-align: center;">Ammunition Types</p> <p>60-mm grenade HEAT Multipurpose-FRAG BASTEG Illumination Smoke Practice</p>	<p style="text-align: center;">Typical Combat Load</p> <p style="text-align: center;">INA</p>
<p>SYSTEM</p> <p>Alternative Designations: Balliste, Pzf 3 Date of Introduction: 1990 Proliferation: At least eight countries</p> <p>Description: Crew: 1 Caliber (mm): Launch Tube: 60 Warhead: 110 Weight (kg): 12 Length (mm): Firing Position: 1,200 Travel Position: 1,200 Rifling: None Breech Mechanism Type: N/A Rate of Fire (rd/min): 5 Fire From Inside Building: Yes</p> <p>SIGHTS</p> <p>Name: INA Type: Optical Magnification: INA Location: Left side Used With Range Finders: Yes Night Sights Available: Yes</p> <p>VARIANTS</p> <p>Panzerfaust 3-T 600: Simrad IS2000 laser gun sight with range of moving targets out to 600 m. Can be fitted with Simrad KN205F night sights.</p>	<p>AMMUNITION</p> <p>Name: INA Caliber (mm): 110 Type: HEAT Range (m): Effective (moving): 300 Effective (stationary): 500 Penetration: Armor (mm): + 700 Weight (kg): 3.8 Muzzle Velocity(m/s): 170 Flight Velocity(m/s): 250 Time of Flight to 300 m (sec): 1.3</p> <p>Name: BASTEG (Barricade and Street Encounter Grenade) Caliber (mm): 110 Type: Shaped-charge w/stand-off fuze Range (m): INA Penetration: Concrete (mm): INA Weight (kg): INA Muzzle Velocity(m/s): INA Flight Velocity(m/s): INA Time of Flight to 300 m (sec): INA</p> <p>OFF-ROUTE MINE SYSTEM</p> <p>Target Speed range (km/h): 30-60 Effective Range (m): 150 Operational Time (days): 40 Acquisition: Targets detected by acoustic sensor which activates the infra-red sensor. Sensors: IR Sensor: Passive, two-color IR Optics: Double parabolic, off-axis Acoustic: Capacitative microphone.</p>	

NOTES

The Panzerfaust 3 is a compact, lightweight, shoulder-fired, unguided antitank weapon. It consists of a disposable cartridge with a 110-mm warhead and reusable firing and sighting device. The Panzerfaust can be adapted to serve as an off-route mine.

Russian 105-mm Antitank Grenade Launcher RPG-29

	<p>Ammunition Types</p> <p>105-mm grenade HEAT (tandem)</p>	<p>Typical Combat Load</p> <p>INA</p>
<p>SYSTEM</p> <p>Alternative Designations: Vampir Date of Introduction: Late 1980s Proliferation: Former Soviet Union</p> <p>Description: Crew: 2 Caliber (tube) (mm): 105 Weight (kg): 11.5 Length (mm): 1,000 Life of Tube/barrel: 300 Rate of Fire (rd/min): INA Fire From Inside Building: INA Maximum Target Speed (km/h): INA Emplacement/displacement time (min): (see NOTES)</p> <p>SIGHTS</p> <p>Name: INA Type: Iron, optical, and night Magnification: INA Location: Left side Sighting Range (m): 450 Night Sights Available: Yes, INA</p>	<p>VARIANTS (see NOTES)</p> <p>AMMUNITION Name: PG-29V Caliber (warhead): 105 Type: HEAT (tandem) Range (m): Effective: 500 Minimum: INA Penetration (m): Armor: +750, (650 behind ERA) Concrete and brick: +1.5 Casualty Radius (m): INA Length (mm): INA Complete Round Weight (kg): 6.7 Muzzle Velocity (m/s): 280</p>	

NOTES

For ease of transportation the RPG-29 can be broken down into two parts which one soldier can carry. It can be made ready to fire within a few seconds. A folding bipod is provided to assist aiming during prone firing. An unnamed variant has a tripod mount and guidance and control system. The guidance and control system of the mounted variant includes an optical sight, laser rangefinder and ballistic data computer for firing on moving targets. This increases the effective range of the mounted system to 800 m against a stationary target with a hit probability of 80%.

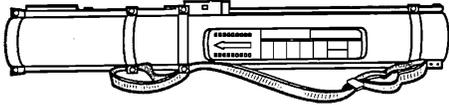
German 67-mm Disposable Antitank Grenade Launcher Armbrust _____

	<p>Ammunition Type</p> <p>67-mm grenade HEAT</p>	<p>Typical Combat Load</p> <p>INA</p>
<p>SYSTEM</p> <p>Alternative Designations: Crossbow Date of Introduction: INA Proliferation: At least seven countries</p> <p>Description: Crew: 1 Caliber (mm): 67 Weight (kg): 6.3 Length (mm): 850 Rifling: None Breech Mechanism Type: N/A Rate of Fire (rd/min): N/A (disposable) Fire From Inside Building: Yes (see NOTES)</p> <p>SIGHTS</p> <p>Name: N/A Type: Reflex Magnification: None Location: Left side Sighting Range (m): INA Night Sights Available: INA</p>	<p>VARIANTS (INA)</p> <p>AMMUNITION</p> <p>Name: INA Type: HEAT Range (m): Maximum: 1,500 Effective AT: 300 Flight Time (sec) @ 300 m: 1.5 Penetration: Armor (mm): 300 Reinforced Concrete (m): INA Muzzle Velocity(m/s): 210</p>	

NOTES

The Armbrust is a preloaded, disposable, shoulder-fired antitank weapon. It has a low signature and low IR detectability and can be safely fired from small enclosed rooms. The muzzle does not emit smoke or blast and no flash can be seen from the rear. Only .8 m clearance is required between the rear of the weapon and the wall. It is quieter than a pistol shot. The entire weapon is considered a round of ammunition and the launcher is thrown away once the weapon is fired. Manufactured by Singapore.

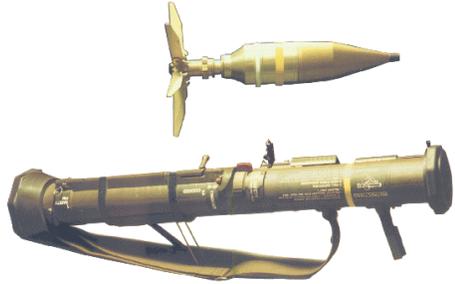
Russian 72-mm Disposable Antitank Grenade Launcher RPG-22

	<p style="text-align: center;">Ammunition Types</p> <p style="text-align: center;">72-mm grenade HEAT</p>	<p style="text-align: center;">Typical Combat Load</p> <p style="text-align: center;">INA</p>
<p>SYSTEM</p> <p>Alternative Designations: INA Date of Introduction: 1985 Proliferation: At least three countries</p> <p>Description: Crew: 1 Caliber (mm): 72 Weight (kg): 2.8 Length (mm): Firing Position: 850 Travel Position: 750 Rifling: None Breech Mechanism Type: N/A Rate of Fire (rd/min): N/A (disposable) Fire From Inside Building: No, backblast out to 30 m behind the weapon.</p> <p>SIGHTS</p> <p>Name: INA Type: Iron, calibrated for 50, 150, 200 m Magnification: None Location: Top of launcher Sighting Range (m): 250 Night Sights Available: No</p>	<p>VARIANTS (None)</p> <p>AMMUNITION (see NOTES)</p> <p>Name: INA Caliber (mm): 72 Type: HEAT Range (m): Effective: 250 Arming Range: INA Penetration: Armor (mm): 390 Brick (m): 1.2 Reinforced Concrete (m): 1 Muzzle Velocity(m/s): Initial: 133 Maximum: 300 Length (mm): 618 Weight (kg): 1.48</p>	

NOTES

The RPG-22 is a lightweight, shoulder-fired, preloaded, disposable antiarmor weapon intended for firing one round, after which the tube is discarded. It is basically a scaled-up version of the RPG-18 (similar to the US LAW) and has no dedicated grenadier; however, all soldiers train to use the squad-level disposable weapon.

Swedish 84-mm Disposable Light Antitank Weapon AT4

	<p>Ammunition Types</p> <p>84-mm round HEDP HEAT</p>	<p>Typical Combat Load</p> <p>INA</p>
<p>SYSTEM</p> <p>Alternative Designations: US M136, Bofors AT 4, FFV AT4 Date of Introduction: INA Proliferation: At least seven countries</p> <p>Description: Crew: 1 Caliber (mm): 84 Weight (kg): 6 Length (mm): Firing Position: 1,000 Travel Position: 1,000 Rate of Fire (rd/min): N/A (disposable) Fire From Inside Building: See AT4 CS</p> <p>SIGHTS</p> <p>Name: INA Type: Popup, preset to 200 m Location: Top left Night Sights Available: Yes, INA</p> <p>VARIANTS (see NOTES)</p> <p>LMAW: Light Multipurpose Assault Weapon, uses HEDP AT4 CS: Confined space AT4 HP: High penetration</p> <p>AMMUNITION</p> <p>Name: AT4 HEAT Caliber (mm): 84 Type: HEAT Range (m): Effective: 300 Arming Range: INA Penetration: Armor (mm): 420 Weight (kg): 6.7 Muzzle Velocity(m/s): 285</p>	<p>Name: LMAW (see VARIANTS) Caliber (mm): 84 Type: HEDP, modified Carl Gustaf HEPD FFV 502 (with dual mode fuze) Range (m): Effective: 300 Arming Range: INA Penetration: Armor (mm): 150 Concrete (m): INA Casualty Radius (m): INA Muzzle Velocity (m/s): 235</p> <p>Name: AT4 CS (confined space) can fire from confined spaces as small as 22.5 m³ Caliber (mm): 84 Type: HEAT or HEDP (LMAW) warheads Range (m): Effective: INA Arming Range: INA Penetration: Armor (mm): INA Weight (kg): INA Muzzle Velocity(m/s): INA</p> <p>Name: AT4 HP (high penetration) Caliber (mm): 84 Type: HEAT Range (m): Effective: INA Arming Range: INA Penetration: Armor (mm): 600 Weight (kg): Less than 7 Muzzle Velocity(m/s): 290</p>	

NOTES

The AT4 is a lightweight, preloaded, disposable antiarmor weapon intended for firing one round, after which the tube is discarded. All AT4 systems share the same launcher but may contain different preloaded munitions. The variant selected depends on the intended use. The AT4's average recoil is comparable to the M16 rifle.

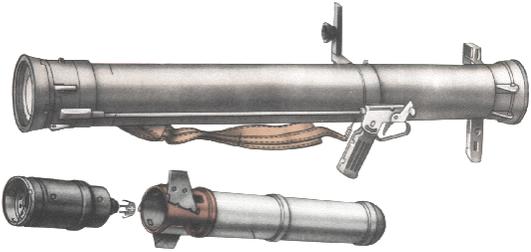
Russian Infantry Rocket Flame Weapon RPO

	<p align="center">Ammunition Types</p> <p>Rocket Rocket-propelled encapsulated napalm projectile.</p>	<p align="center">Typical Combat Load</p> <p align="center">2</p>
<p>SYSTEM Alternative Designations: Rys (Lynx) Date of Introduction: Late 1970s Proliferation: FSU</p> <p>Description: Crew: 1 Weight (kg): Empty: 3.5 Pack (launcher and two rounds): 22 Length (ready to fire) (m): 1.44 Rate of Fire (rockets/min): 1 Reaction Time-Travel to Fire (sec): 60 Fire From Inside Building: INA Tube Life: 100 rounds</p> <p>Launcher Components: Firing tube, firing mechanism, mechanical sights, collapsing bipod and sling.</p> <p>PERFORMANCE</p> <p>Range (m): Effective: 190 Maximum: 400 Minimum: INA Accuracy: INA Muzzle Velocity (m/s): INA</p>	<p>SIGHTS</p> <p>Name: N/A Type: Open metal, front and rear Location: Left side, rear is on-line with rear of grip Magnification: None Night Sights Available: INA</p> <p>VARIANTS (None)</p> <p>AMMUNITION</p> <p>Name: RPO Type: Incendiary Warhead Incendiary Fill (liters): 4 Weight of Incendiary in Warhead (kg): 4 Type of Incendiary: Pyrogel Burn Temperature (°C): 800-1,000 Caliber (mm): 122 Casualty Radius: Fire envelope 10-40 m deep in the direction of the shot with a spray width of 3-4 m. Components: Container, warhead canister, propulsion unit</p>	

NOTES

The RPO is a combat-tested, shoulder-fired reusable weapon that fires a rocket-propelled encapsulated napalm warhead. It was designed to replace the LPO-50. The RPO is carried in two parts that must be connected to fire. Squeezing the trigger ignites the rocket with an electric spark. Part of the propellant gas enters the container and pushes the canister, kindling the igniter which in turn, ignites the incendiary mixture. The napalm in the RPO ignites at the initial stage of the flight and upon impact burning pieces are scattered all over the target. Although still in use by the OPFOR Flamethrower Bn (Encapsulated) at Corps or Army level (and other armies), the RPO has generally been replaced by the Infantry Rocket Flame Weapon RPO-A Series (RPO-A/D/Z).

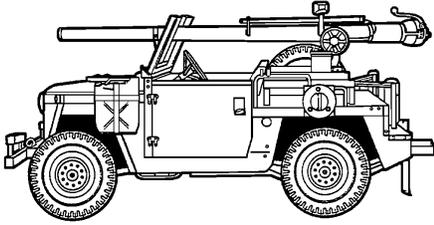
Russian Infantry Rocket Flame Weapon RPO-A Series (RPO-A/Z/D)

	<p style="text-align: center;">Ammunition Types</p> <p>Rocket RPO-A: Thermobaric-flammable mixture RPO-Z: Incendiary RPO-D: Smoke</p>	<p style="text-align: center;">Typical Combat Load</p> <p style="text-align: center;">2</p>
<p>SYSTEM</p> <p>Alternative Designations: Shmel (Bumblebee) Date of Introduction: 1984 Proliferation: Widespread</p> <p>Description: Crew: 1 Caliber (mm): 93 Number of Weapons in a Package: 2 Weight of Package (kg): 12 Total weapon (1) weight (kg): 11 Length (mm): 920 Rate of Fire (rockets/min): 2 Reaction Time-Travel to Fire (sec): 30 Fire From Inside Building: Yes. It can be fired in enclosures of 60 m³ or greater or with a barrier behind the weapon. Components: Container, ejection motor, warhead.</p> <p>PERFORMANCE</p> <p>Range (m): Direct Fire: 200 With Optical Sight: 850 Effective: 600 Minimum: 20 Indirect Fire: 1,000 Accuracy @ 200 m: .5 m² Muzzle Velocity (m/s): 125</p>	<p>SIGHTS</p> <p>Name: OPO-1 Type: Optical calibrated to 600 m Location: Left, next to grip Magnification: None Night Sights Available: INA</p> <p>VARIANTS (None)</p> <p>AMMUNITION</p> <p>Name: RPO-A Type: Thermobaric Casualty Radius (m): 50 (personnel in open) Lightly armored materiel kill probability at 400 m: 0.7 Burn Temperature (°C): 800+ Warhead Explosive Type: Trotyl equivalent (kg) -2 Warhead Mixture Weight (kg): 2.1</p> <p>Name: RPO-Z Type: Incendiary Warhead Mixture Weight (kg): 2.5</p> <p>Name: RPO-D Warhead Weight (kg): 2.3 Smoke-Incendiary Type: Based on red phosphorous. Smokescreen: Time of Formation (min): 2 Length (m): 55 to 90 Depth (m): INA Height (m): INA Duration (min): 3 to 5 Effective Against: Visual and infrared</p>	

NOTES

Designed as a follow-on to the RPO, the RPO-A, -Z, and -D are one-shot, disposable, shoulder-fired, combat tested (Afghanistan, Tajikistan, Chechnya), flame weapons. They are reliable and can be ready to fire within 30 seconds. Any soldier, infantryman, or paratrooper can use this close-combat weapon with minimal instruction. The RPO-A comprises three basic components: container, ejection motor, and case which is filled, depending on its purpose, with thermobaric (enhanced blast explosive), smoke or incendiary rockets. At any range the blast effects of the thermobaric munitions are much more serious than the thermal effects. The RPO-A is known as the infantryman's pocket artillery because the demolition effect corresponds to the 122-mm HE artillery, and 120-mm mortar projectile. The RPO series of flame weapons also serves as an extremely effective counter-sniper weapon. The armor- and mechanized -based OPFOR usually issues one RPO-A per BMP (mechanized infantry squad). They are also found in the Flamethrower Bn (Encapsulated) at Corps or Army level. One squad per infantry platoon has a RPO-A in the infantry-based OPFOR. The RPO-A series of flame weapons are issued more along the lines of ammunition rather than a weapon, therefore the BOI may vary.

United States 106-mm Recoilless Rifle M40

	<p>Ammunition Types</p> <p>106-mm recoilless gun HEAT HEAT-T HEP-T APERS-T HEAP</p>	<p>Typical Combat Load</p> <p>INA</p>
<p>SYSTEM</p> <p>Alternative Designations: (see VARIANTS) Date of Introduction: 1953 Proliferation: At least 50 countries</p> <p>Description: Crew: 2 Caliber (mm): 106 Weight (kg): With Spotting Rifle: 130 Gun Only: 113 Length (m): Total: 3.40 Barrel: 2.85 Width (on M79 mount) (m): Legs Spread: 1.524 Legs Closed: .8 Height (on M79 mount) (m): 1.3 Bore: Rifled 36 grooves, rh Breech Type: Interrupted thread Recoil System: Vented breech Feed: Manual Traverse (°): 360 Elevation (°) (M79 Mount): -17/+65 Rate of Fire (rd/min): 5 Spotting Rifle: .50 cal M8C Emplacement/displacement time (min): INA Fire From Inside Building: No Complete Round Weight (kg): 13 Muzzle Velocity (m/s): 570</p> <p>SIGHTS</p> <p>Name: INA Type: Optical Name: Bofors modernization package Type: Simrad LP101 laser sight in place of the ranging gun Magnification: INA Location: INA Name: Bofors modernization package Type: Computerized LASer Sight (CLASS) Magnification: INA Location: INA Night Sights Available: Yes, INA</p>	<p>VARIANTS</p> <p>M79 Mount: Tripod, ground, or vehicle M50 Ontos: Six-barrel mount on small tracked vehicle PAK-66: Austrian M40 on two-wheel carriage</p> <p>AMMUNITION</p> <p>Name: M344A1 Type: HEAT Range (m): Maximum Effective: 1,350 Maximum Range: 2,745 Armor Penetration (mm): INA Complete Round Weight (kg): 16.8 Muzzle Velocity (m/s): 503</p> <p>Name: 3/A-HEAT-T (Bofors upgrade) Type: HEAT-Tracer Range (m): Maximum Effective: 2,000 Armor Penetration (mm): 700 + Complete Round Weight (kg): 14.5 Muzzle Velocity (m/s): 570</p> <p>Name: M346A1 Type: HEP-T (HE plastic-tracer) Range (m): Maximum: 6,870 Complete Round Weight (kg): 16.95 Muzzle Velocity (m/s): 498</p> <p>Name: M581 Type: APERS-T (antipersonnel-tracer) (flechette) Fill (.5 g ea): 10,000 flechettes Range (m): Maximum Effective: 300 Complete Round Weight (kg): 18.73 Muzzle Velocity (m/s): 438</p> <p>Name: HEAP M-DN Type: HE antipersonnel (steel pellets) Fill: 1,000 steel pellets Range (m): Maximum Effective: 1,500 Lethal Radius: 40 Complete Round Weight (kg): 16.4 Muzzle Velocity (m/s): 560</p>	

NOTES

The US M40 or M40A1 recoilless rifle is an antitank weapon. It uses a .50 cal spotting rifle mounted along the axis of the barrel to determine proper elevation for the 106-mm barrel. Upgraded systems may have the Simrad laser sight in lieu of the ranging (spotting) gun.

Chapter 2 Infantry Vehicles

Infantry vehicles can vary from general transport assets such as trucks, to specially designed *light armored fighting vehicles (LAFVs)*. The intensity of combat on the modern battlefield requires infantry vehicles that are mobile, survivable, and lethal. Many ground forces have programs underway to field infantry LAFVs for modern requirements. Because of budgetary constraints, many ground forces continue using infantry vehicles which we might consider obsolete, but which are well suited for their environment and military role. A number of forces have aggressive upgrade programs for older systems. The U.S. Army, in its next conflict, is likely to encounter infantry forces with a mix of older and newer infantry vehicles.

CLASSIFICATION

Infantry LAFVs are generally classed as *armored personnel carriers* (APCs) or *infantry fighting vehicles* (IFVs). The lighter, less protected and less lethal system is the APC. It is intended to carry soldiers to the close combat zone, then dismount them for their commitment to the fight. An IFV is designed to fight with soldiers onboard, to carry the soldiers forward without dismounting them if possible, and to support them with direct fires if they do dismount. The plethora of upgrade options available is permitting both APCs and IFVs to become more mobile, survivable, and lethal. Thus we see APCs with IFV survivability or IFV lethality, or with both—which transforms them into IFVs. We also see IFVs with vulnerabilities which ill-suit them for their mission requirement. This chapter highlights key infantry vehicles, with an emphasis on their capabilities in mobility, survivability and lethality. Please note that on the modern battlefield, lack of a capability (swim, night sights, etc.) is in fact a vulnerability.

TRENDS

This chapter highlights infantry LAFV features in terms of mobility, survivability, and lethality. Armies have been looking at ways to balance the need for increased protection with limitations that additional armor brings, such as the need to be amphibious. One solution is to accept a lack of swim capability for a segment of up-armored IFVs, coupled with a distribution of (less armored) amphibious vehicles within the force. Other armies are looking at limited addition of applique armor or active protection systems. Several companies have developed light explosive reactive armor (ERA), which can be used on LAFVs. However, this is a less likely upgrade, because exploding armor fragments are a hazard to dismounted soldiers.

In the past, higher combat power and cost of tanks justified the wide disparity in firepower between tanks and IFVs. However, modern IFVs, when fully manned and equipped, may have equal or higher combat power and similar cost. Therefore, lethality improvements previously afforded to tanks are being added to selected IFVs. A wide variety of lethality upgrades are available for LAFVs. These include larger main weapons and antitank guided missile (ATGM) launchers, and improved fire control systems (FCS), especially night sights. The simplest but sometimes most costly upgrade is improved ammunition.

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Improved secondary armaments for aerial targets permit the main weapon to focus more on heavy targets. Thus, several countries are adding remote day sights and night sights and improved ammunition for machineguns (MGs). Others are adding automatic grenade launchers to supplement MG fires.

The aerial threat to AFVs has prompted ground forces to address that threat. One response is proliferation of air defense assets, such as shoulder-fired SAMs. A more direct response which is difficult to counter, is cost-effective, and has long-term benefits for force effectiveness, is to better equip the vehicles for counterair fires. Some infantry vehicles have been fitted with high-angle-of-fire turrets (e.g., BTR-80) and anti-aircraft sights (BMP-3). Improved fire control technology has led to more exotic ammunition solutions. The BMP-3 gun-launched ATGM has a higher velocity for use against helicopters. Another new development is ballistic computer-based electronically-fuzed frag-HE rounds, including forward- and side-firing rounds, which can defeat rotary-wing aircraft and ground-based antiarmor positions at stand-off range.

Infantry vehicles offer the most economical armored vehicle chassis for development of combat support and service support vehicles, including air defense vehicles, artillery, C⁴, reconnaissance, etc. Noted variants offer a link to other systems described in the WEG.

This chapter provides a representative sampling of infantry vehicles in use today. The selection is not comprehensive, rather reflects APCs and IFVs currently available to the OPFOR. Within this chapter, other types of infantry vehicles are also noted. These include airborne vehicles and multipurpose transporters. Other armored transport vehicles available to infantry units are armored trucks (e.g., former Soviet BTR-152), amphibious assault vehicles (such as U.S. LVTP7), jeep-type vehicles (e.g., HMMWV), and fast-attack vehicles (based on so-called dune buggy designs). Examples of alternative vehicles will be added in later issues of the WEG.

TECHNICAL NOTES

The following notes apply to infantry LAFVs, and to combat vehicles (in other chapters) that are used for reconnaissance, tank/assault, antitank, air defense, and artillery roles. Weapon, fire control, and munition-related narrative applies to towed and ground weapon systems.

On each equipment sheet, the top of the page provides an illustration (line drawing or photo of the system) and a summary of weapons and munitions. Note that a Typical Combat Load, when available, may be estimated. In actuality, ammunition load depends on specific country holdings, on time frame, and on scenario tactical considerations.

System and Variants sections provide basic data to assist in understanding current system status and proliferation, as well as possible upgrade options. Under Description, to assure comparability on vehicle dimensions, gun tube length is not included in those dimensions.

In the area, Automotive Performance, the figure *max off-road* denotes speed on dirt roads. The figure *average cross-country* is used for true off-road speed; for selected systems, it was measured on an approved course. Although some systems have specified radios, for many OPFOR countries, radios will be replaced to link with their military radio nets.

Protection figures for use in simulation applications must be measured by certifying agencies in accordance with specific Army standards. Figures on equipment sheets include published data provided for general information use, and may not coincide with vulnerability data developed by approved agencies. Protection options are available for upgrading systems. The wide variety of supplemental protection packages include active and passive armor, active protection systems and countermeasure systems. Although upgrades are being advertised and are technically possible, that does not mean that they are tactically sound, or that the application fits the OPFOR to be portrayed. Other options are generally available for installation; but, because their applicability has not been noted for specific systems, they were not included. Only a few countermeasure parameters were included. However, specific protection upgrades and systems are noted for selected OPFOR systems.

System lethality is determined by a variety of interrelated functions and considerations in the process of bringing destruction upon enemy forces and equipment. Lethality is addressed on the equipment sheets under the headings of Armament, Fire Control, Sights, and Main Armament Ammunition. Lethal fires can be delivered by *direct fire*, in which weapon systems acquire and observe their targets, or by *indirect fire*, in which weapons use remote acquisition assets to direct their fires. Note that direct-fire systems such as tanks can receive remote acquisition reports and engage targets by indirect fire; and indirect fire systems (such as artillery) can employ direct-fire sights to fire in the direct-fire mode. For the WEG, high-angle fires are not interpreted as indirect fires as long as the firing weapon uses its own sights to acquire and aim.

Factors affecting lethality, which are considered in the WEG, include: rates of fire, various ranges, accuracy and errors, acquisition/fire control capabilities, lethality effects, ammunition, and ability to engage targets on the move. Any of these technical factors, and other more subtle ones, may affect lethality in combat. Note also that various rates of fire are used, with adjusting factors, such as movement status and type of target. Generally automatic weapon use life dictates that, for more than a 3-4 second interval, the number of rounds expended will not exceed the *practical* rate of fire. However, maximum rate is critical against fast-closing targets, such as flying aircraft.

Range is not a fixed figure for most systems. It can be directly affected by four technical factors: gun/launcher configuration, mount (how it is fixed to the system), acquisition capability, and specific munition ballistics. Range is also related to less tangible factors, such as movement status (moving versus stationary, and movement speed), target type, elevation angle (such as for air defense weapons), visibility conditions, and terrain. Each weapon can have different ranges listed by ammunition type and model, where munitions are broken out. Generally, the range of direct-fire frag-HE rounds is greater than munitions designed for point targets, because the effects area is much greater than those of shaped-charge or kinetic-energy rounds. With fragmentation and blast effects, a near miss may be good enough to inflict severe damage. With these considerations, the WEG provides a figure called *maximum aimed range*. This range indicates the farthest range for system-on-system aimed direct fire.

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The maximum aimed range is based on a combination of tactics, techniques and procedures (TTPs), and on parameters of the technical factors noted above: gun/launcher, mount, acquisition system, and ammunition ballistics. This direct-fire range significantly exceeds the weapon's *maximum effective range*. The maximum effective range/night denotes the effective range for a round, given available night acquisition capabilities. The TTPs also call for a "salvo range" for armored fighting vehicles, which exceeds other ranges and requires one or more volleys of a platoon against a single point target. These figures are less tangible, are based on TTP, and are not included in the WEG.

Probability of hit data is included for instructional purposes, not for use in simulations and models. Accuracy for weapons, munitions, and acquisition systems decreases with range. Antitank guided missiles are an exception; they usually have a singular probability of hit for all ranges, based on technical precision capability. Limitations, vulnerabilities, and countermeasures can affect actual performance. Several of these factors are noted on equipment pages.

Lethality performance given a hit can be measured in terms of radius of effects for fragmentation/blast effects against soft targets, and penetration distance (through steel) against hard targets. The fragmentation and blast effects of a frag-HE round mean that it is less lethal against hard targets, such as heavily armored vehicles. Another consideration is the level of destruction required. For many possible adversary forces, the critical requirement against armored vehicles is not a 100% or catastrophic kill. A mobility kill or firepower kill may be sufficient to render a system combat-ineffective, and may be counted in lethality data. The OPFOR can employ a mix of lethal and nonlethal methods. Fires of degrading (versus destructive) munitions such as smoke, mines, and radio frequency jammers can be used to suppress units and support the effort. Consult other manuals in the FM 100-60 series and other approved publications for guidance on these tactics, techniques, and procedures.

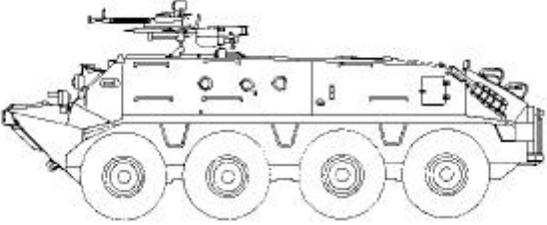
Questions and comments on data listed in this chapter should be addressed to:

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Russian Armored Personnel Carrier BTR-60PA

	<p>Weapons & Ammunition Types</p> <p>12.7-mm DShK MG APDS, API, API-T, HE-T, HEI, I-T</p> <p>2 x 7.62-mm PKT MG Lt Ball, Ball-T API, API-T</p>	<p>Typical Combat Load</p> <p>500 250 250</p> <p>3,000</p>
<p>SYSTEM Alternative Designations: BTR-60-PK Date of Introduction: 1963 Proliferation: At least 30 countries (including variants) Description: Crew: 2 Troop Capacity: 12 Combat Weight (mt): 10.1 Chassis Length Overall (m): 7.22 Height Overall (m): 2.06 Width Overall (m): 2.82 Ground Pressure (kg/cm²): INA Drive Formula: 8 x 8</p> <p>Automotive Performance: Engine Type: 2 x 180-hp Gasoline Cruising Range (km): 500 Speed (km/h): Max Road: 80 Max Off-Road: 60 Average Cross-Country: INA Max Swim: 10 Fording Depths (m): Amphibious</p> <p>Radio: INA</p> <p>Protection: Armor, Turret Front (mm): 7-9mm hull front (no turret) Applique Armor (mm): N/A Explosive Reactive Armor (mm): N/A Active Protective System: N/A Mineclearing Equipment: N/A Self-Entrenching Blade: N/A NBC Protection System: Collective Smoke Equipment: N/A</p> <p>ARMAMENT Main Armament: Caliber, Type, Name: 12.7-mm (12.7 x 108) heavy MG, DShK Rate of Fire (rd/min): 80-100 (practical) Loader Type: Belt feed Ready/Stowed Rounds: INA Elevation (°): -10/+80 Fire on Move: Yes</p> <p>Auxiliary Weapons: Caliber, Type, Name: 2 x 7.62-mm machinegun PKT Mount Type: Vehicle top Maximum Aimed Range (m): 1,500 Max Effective Range (m): Day: 1,000 Night: N/A</p>	<p>Fire on Move: Yes Rate of Fire (rd/min): 250 practical / 650 cyclic, in 2-10 rd bursts</p> <p>ATGM Launcher: N/A Firing Ports: 3 on each side</p> <p>FIRE CONTROL FCS Name: N/A Main Gun Stabilization: N/A Rangefinder: N/A Infrared Searchlight: N/A Sights w/Magnification: Gunner: Day: K10-T Field of View (°): INA Acquisition Range (m): 1,500 (est) Night: N/A Commander Fire Main Gun: No</p> <p>VARIANTS A variety of armament variants for the vehicle were used, including single 7.62-mm PKT MG, or 12.7-mm MG, or no MG.</p> <p>Artillery command and reconnaissance vehicles. ACRV 1V18 is a command and observation vehicle (COP). ACRV 1V19 is a fire direction center (FDC).</p> <p>BTR-60PB: The most widely fielded variant has a one-man turret, a 14.5-mm KPVT MG, a coaxial 7.62-mm MG and day/night sights.</p> <p>BTR-60PBK: Company commander variant with 3 additional radios</p> <p>BTR-60 PU: Armored command vehicle (ACV) variant with a 10-m mast radio antenna and front-to-rear rail antenna for mobile use</p> <p>BTR-60 PU-12/-12M: Air defense associated ACV and its upgrade</p> <p>BTR-60 R-975: Forward air controller turreted variant.</p> <p>MTP-2: Armored recovery vehicle</p> <p>R-145BM: ACV with R-111, R-123, and R-130M radios and the distinctive Clothesline antenna</p>	

Russian Armored Personnel Carrier BTR-60PA continued

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<p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 12.7-mm, APDS Chinese, Type 54 Maximum Aimed Range (m): 1,500 Max Effective Range (m): Day: 1,500 vehicles Night: N/A Tactical AA Range: 1,600 Armor Penetration (mm): INA</p> <p>12.7-mm, API/API-T Type 54 Maximum Aimed Range (m): 1,500 Max Effective Range (m): Day: 1,500 unarmored ground / 800 armored Night: N/A Tactical AA Range: 1,000 Armor Penetration (mm): INA</p>	<p>Other Ammunition Types: Incendiary-T, HE-T Type MDZ, HEI Type ZP, Russian Duplex, Russian Duplex-T</p>
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NOTES

This vehicle is a roofed variant of the BTR-60P open-hatch armored carrier. It is widely fielded in original and modified form. The APC has a top-mounted 12.7-mm MG forward of rectangular gunner's hatch. Where an additional two 7.62-mm MGs are mounted, they are right and left of the hatch. Because of space restriction, no more than one or two gunners can fit in the opening.

A notable vulnerability is that passengers have to exit the vehicle through top hatches, which makes them vulnerable to fires. Also, gunners must be at least shoulder high out of the vehicle to operate the weapons.

Russian Armored Personnel Carrier BTR-80

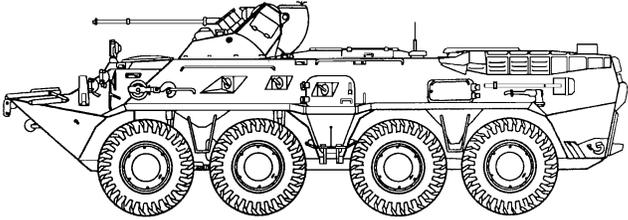
		<p>Weapons & Ammunition Types</p> <p>14.5-mm turret MG API, API-T</p> <p>7.62-mm coax PKT MG Light ball, Ball-T, API, API-T, I-T</p>	<p>Typical Combat Load</p> <p>500</p> <p>2,000</p>
<p>SYSTEM Alternative Designations: GAZ-5903 Date of Introduction: 1984 Proliferation: At least 22 countries Description: Crew: 2 Troop Capacity: 8 Combat Weight (mt): 13.6 Chassis Length Overall (m): 7.55 Height Overall (m): 2.41 Width Overall (m): 2.95 Ground Pressure (kg/cm²): INA Drive Formula: 8 x 8</p> <p>Automotive Performance: Engine Type: 260-hp Diesel Cruising Range (km): 600 Speed (km/h):Max Road: 85 Max Off-Road: 60 Average Cross-Country: 40 Max Swim: 10 Fording Depths (m): Amphibious</p> <p>Radio: R-173</p> <p>Protection: Armor, Turret Front (mm): Against 12.7mm Applique Armor (mm): Available Explosive Reactive Armor (mm): N/A Active Protective System: N/A Mineclearing Equipment: N/A Self-Entrenching Blade: N/A NBC Protection System: Collective Smoke Equipment: 6 x 81-mm smoke grenade launchers</p> <p>ARMAMENT Main Armament: Caliber, Type, Name: 14.5-mm (14.5 x 114) heavy MG, KPVT Rate of Fire (rd/min): 150 practical Loader Type: Belt-fed Ready/Stowed Rounds: 50/450 Elevation (°): -4/+60 Fire on Move: Yes</p> <p>Auxiliary Weapon: Caliber, Type, Name: 7.62-mm machinegun, PKT Mount Type: Coax Maximum Aimed Range (m): 1,500</p>	<p>Max Effective Range (m): Day: 1,000 Night: N/A Fire on Move: Yes Rate of Fire (rd/min): 250 practical/650 cyclic, 2-10 round bursts ATGM Launcher: N/A Firing Ports: 3 on each side</p> <p>FIRE CONTROL FCS Name: N/A Main Gun Stabilization: N/A Rangefinder: N/A Infrared Searchlight: OU-3GA2M Sights w/Magnification: Gunner: Day: 1P3-6, 1.2x/4x Field of View (°): 49/14 Acquisition Range (m): 2,000 Night: N/A Commander Fire Main Gun: No</p> <p>VARIANTS BTR-80A: IFV with a stabilized turret containing a 30-mm 2A42 (BMP-2) automatic gun, coax 7.62-mm MG, and TNP-3 day/night sights. This vehicle is in prototype and offered for export. The drop-in turret package is also offered for export. A BTR-80S variant includes the turret/fire control, but with 14.5-mm versus 30-mm gun.</p> <p>BTR-80K: Command variant w/ added R-173, R-173P, and R-159 (portable) radios, R-174intercom, navigation aids, and an 11-m mast</p> <p>1V152: Artillery battalion command vehicle 2S23: 120-mm self-propelled combination gun (howitzer/mortar) BREM-K: Armored recovery vehicle RKhM-4: NBC reconnaissance vehicle UNSh: Standardized expanded chassis for current variants, including Kushetka-B ACRV and BMM vehicle series.</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 14.5-mm API-T Maximum Aimed Range (m): 2,000 Max Effective Range (m): Day: 2,000 Night: INA Tactical AA Range: 1,500-2,000 Armor Penetration (mm): 20 at 1,000 m/ 30 at 500 m</p> <p>Other Ammunition Types: API, I-T</p>		

NOTES

BTR-80 is superior to BTR-60/70 with a larger chassis, high-angle-of- fire turret, and single more powerful diesel engine (vs gasoline). Options include the Kliver turret with a 30-mm gun, 7.62-mm coax MG, thermal sights, superior day sights, and (four) Kornet ATGM launchers.

Russian Armored Personnel Carrier BTR-80A

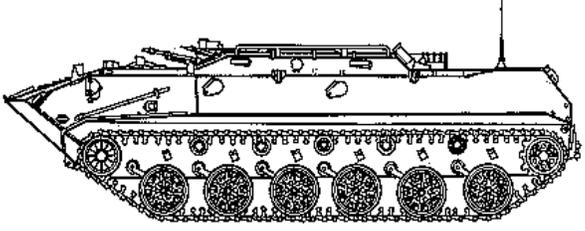
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	<p>Weapons & Ammunition Types</p> <p>30-mm automatic gun HEI-T, Frag-HE-T AP-T, APDS-T, APFSDS-T</p> <p>7.62-mm coax MG</p>	<p>Typical Combat Load</p> <p>300</p> <p>2,000</p>
<p>SYSTEM Alternative Designations: GAZ-59034 Date of Introduction: 1994 Proliferation: At least 3 countries Description: Crew: 2 Troop Capacity: 8 Combat Weight (mt): 14.6 Chassis Length Overall (m): 7.65 Height Overall (m): 2.80 Width Overall (m): 2.90 Ground Pressure (kg/cm²): INA Drive Formula: 8 x 8</p> <p>Automotive Performance: Engine Type: 260-hp Diesel Cruising Range (km): 800 Speed (km/h): Max Road: 90 Max Off-Road: INA Average Cross-Country: INA Max Swim: 10 Fording Depths (m): Amphibious</p> <p>Radio: R-163-50U VHF, R-163-UP receiver, R-174 intercom</p> <p>Protection: Armor, Turret Front (mm): Can defeat 12.7-mm Applique Armor (mm): N/A Explosive Reactive Armor (mm): N/A Mineclearing Equipment: No Self-Entrenching Blade: N/A Active Protective System: N/A NBC Protection System: Collective Smoke Equipment: 6 x 81-mm smoke grenade launchers</p> <p>ARMAMENT Main Armament: Caliber, Type, Name: 30-mm automatic gun, 2A72 Rate of Fire (rd/min): 200-330 variable cyclic in bursts Loader Type: Dual-belt feed Ready/Stowed Rounds: 300/0 Elevation (°): -5 to +70 Fire on Move: Yes</p> <p>Auxiliary Weapon: Caliber, Type, Name: 7.62-mm machinegun PKT Mount Type: Coax Maximum Aimed Range (m): 1,500 Max Effective Range (m): Day: 1,000 Night: 800+</p>	<p>Fire on Move: Yes Rate of Fire (rd/min): 250 practical/650 cyclic, 2-10 round bursts</p> <p>ATGM Launcher: N/A Firing Ports: 4 right side, 3 left side</p> <p>FIRE CONTROL FCS Name: N/A Main Gun Stabilization: 2-plane Rangefinder: INA Infrared Searchlight: OU-5 Sights w/Magnification: Gunner: Day: 1P3-9, 1.2x/4x Field of View (°): 49/14 (est) Acquisition Range (m): 4,000 Night: TPN3-42 II/IR Field of View (°): INA Acquisition Range (m): 800 Commander Fire Main Gun: No</p> <p>VARIANTS BTR-80S: APC has the same turret with 14.5-mm vs 30-mm gun.</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 30-mm APDS-T Maximum Aimed Range (m): INA Max Effective Range (m): Day: 2,000 Night: INA Tactical AA Range: 2,500 Armor Penetration (mm): 25 (RHA) at 1,500 m</p> <p>30-mm APFSDS-T, M929 Maximum Aimed Range (m): INA Max Effective Range (m): Day: 2,000+ Night: INA Tactical AA Range: 2,500 Armor penetration (mm): 55 (RHA) at 1,000 m/45 at 2,000 m</p> <p>30-mm Frag-HE Maximum Aimed Range (m): 4,000 Max Effective Range (m): Day: 4,000 Night: INA Tactical AA Range: 2,500 Armor Penetration (mm): INA</p> <p>Other Ammunition Types: 30-mm AP-T, HEI-T</p>	

NOTES

The drop-in gun/turret package (Modular Weapon System) is offered for export, to upgrade a wide variety of vehicles to BTR-80A standard. BTR-80A can mount K1-126 bullet-resistant tires.

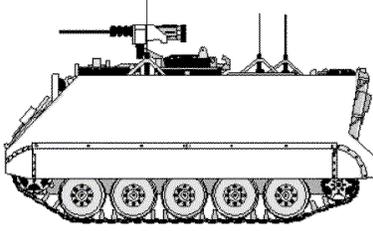
Russian Airborne Armored Personnel Carrier BTR-D _____

	<p>Weapons & Ammunition Types</p> <p>2x 7.62-mm hatch MG Lt Ball, Ball-T, API, API-T, Incendiary</p>	<p>Typical Combat Load</p> <p>2,000</p>
<p>SYSTEM Alternative Designations: BMD M1979 Date of Introduction: 1974 Proliferation: At least 1 country Description: Crew: 1 Troop Capacity: 12 passengers Combat Weight (mt): 6.7 Chassis Length Overall (m): 5.88 Height Overall (m): 1.67 Width Overall (m): 2.63 Ground Pressure (kg/cm²): 0.5</p> <p>Automotive Performance: Engine Type: 240-hp Diesel Cruising Range (km): 500 Speed (km/h): Max Road: 61 Max Off-Road: 35 Average Cross-Country: INA Max Swim: 10 Fording Depth (m): Amphibious</p> <p>Radio: R-123</p> <p>Protection: Armor, Turret Front (mm): "Antibullet" (7.62-mm) Applique Armor (mm): N/A Explosive Reactive Armor (mm): N/A Mineclearing Equipment: N/A Self-Entrenching Blade: N/A Active Protective System: No NBC Protection System: Yes Smoke Equipment: 2x2 forward firing smoke grenade launchers Vehicle engine exhaust smoke system (VEESS)</p> <p>ARMAMENT Main Armament: Caliber, Type, Name: 7.62-mm (7.62 x 54R) machinegun, PKT Rate of Fire (rd/min): 250 practical / 650 cyclic, in 2-10 round bursts Loader Type: Belt-fed Ready/Stowed Rounds: INA Elevation (°): INA Fire on Move: Yes</p> <p>Auxiliary Weapon: N/A</p>	<p>ATGM Launcher: N/A Firing Ports: 2 on each side, 1 in left rear door, permit two 5.45-mm RPK-74 light machineguns to be used.</p> <p>FIRE CONTROL FCS Name: N/A Main Gun Stabilization: N/A Rangefinder: N/A Infrared Searchlight: N/A Sights w/Magnification: Open, 1x Commander Fire Main Gun: No</p> <p>VARIANTS 1V118 Reostat/1V119 Spektr: Artillery command and observation posts for amphibious and airborne forces. 2S9: 120-mm self-propelled combination gun, with a turreted breech-loaded mortar/howitzer system. BMD-KShM: Former Soviet regiment or division command and staff variant, with large Clothes-line antenna. BREM-D: Armored repair and recovery variant. BTR-RD/Robot: An ATGM variant (AT-4/-5) with 2 launchers, dismounted or mounted on pintles for vehicle launch. BTR-ZD: Air defense variant with porteed or towed ZU-23 twin 23-mm air defense gun. Vehicle also carries manpad SAM launchers. BTR-3D: Air defense variant with a rear-mounted ZU-23 gun. Sterkh (Malakit/Shmel): UAV transporter and launcher vehicle.</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 7.62-mm API Maximum Aimed Range (m): 1,500 Max Effective Range (m): Day: 1,000 m / 400-500 on the move Night: INA Tactical AA Range: INA Armor Penetration (mm): 8 (RHA) at 500 m</p> <p>Other Ammunition Types: 7.62-mm Light Ball, Ball-T, Heavy Ball, API, API-T, Incendiary</p>	

NOTES

BTR-D is a variant of the BMD-1, with an additional road wheel, with the turret removed, and with a raised hatch area. The vehicle can be parachute landed with airborne troops. The BTR-Ds in grenade launcher units will carry one AGS-17 30-mm AGL in the rear. Options include the Kliver turret with a 30-mm gun, 7.62-mm coax MG, thermal sights, superior day sights, and (four) Kornet ATGM launchers.

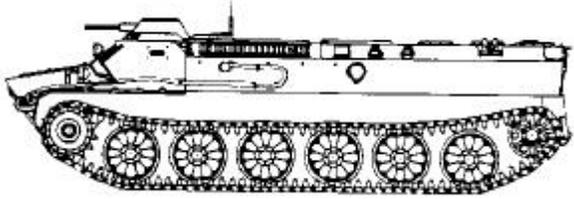
US Armored Personnel Carrier M113A1

	<p>Weapons & Ammunition Types</p> <p>.50 cal cupola MG Slap, API, API-T, Ball, Ball-T, Incendiary, I-T</p>	<p>Typical Combat Load</p> <p>2,000</p>
<p>SYSTEM Alternative Designations: INA Date of Introduction: 1964 Proliferation: At least 46 countries Description: Crew: 2 Troop Capacity: 11 passengers Combat Weight (mt): 11.20 Chassis Length Overall (m): 4.90 Height Overall (m): 1.80 Width Overall (m): 2.70 Ground Pressure (kg/cm²): .55</p> <p>Automotive Performance: Engine Type: 215-hp Diesel Cruising Range (km): 483 Speed (km/h): Max Road: 64 Max Off-Road: INA Average Cross-Country: INA Max Swim: 5.8 Fording Depths (m): Amphibious</p> <p>Radio: Various, including intercom</p> <p>Protection: Armor, Turret Front (mm): N/A—No turret Applique Armor (mm): Yes—anti-mine armor on bottom Explosive Reactive Armor (mm): Available Active Protective System: N/A Mineclearing Equipment: N/A Self-Entrenching Blade: N/A NBC Protection System: N/A Smoke Equipment: N/A</p> <p>ARMAMENT Main Armament: Caliber, Type, Name: .50 cal (12.7 x 99) heavy machinegun, M2HB Rate of Fire (rd/min): 450-550 cyclic Loader Type: Belt feed Ready/Stowed Rounds: 250/1750 Elevation (°): -20/+60 Fire on Move: Yes</p> <p>Auxiliary Weapon: N/A ATGM Launcher: N/A Firing Ports: None</p> <p>FIRE CONTROL FCS Name: N/A</p>	<p>Main Gun Stabilization: N/A Rangefinder: N/A Infrared Searchlight: N/A Sights w/Magnification: Gunner: Day: Open ladder sight, 1x Field of View (°): INA Acquisition Range (m): 2,000 Night: N/A Commander Fire Main Gun: No</p> <p>VARIANTS More than 100 variants have been produced in numerous countries, with 7.62-mm MGs, 40-mm automatic grenade launchers, 90-mm recoilless rifles, and turrets with 20-to-76-mm cannons. The following are US variants. Command variants are M577 and M114 (C&R). Self-propelled mortars are M125 (81-mm) and M106A2 (4.2-inch). The M901/ITV ATGM launcher vehicle is a common variant. The M163 SP air defense gun has a 20-mm Vulcan cannon; and M730 is a Chapparral AD missile launcher. Other variants include ambulances, recovery and engineer vehicles.</p> <p>M113A2: This multi-national variant features mobility improvements. One version is being developed with the Giat TS90 90-mm cannon. M113A3: Changes for this multi-national variant include a new power train and increased armor protection.</p> <p>AIFV: The multi-national IFV variant has M113A3 armor upgrades, a stabilized turret with 25-mm gun, and a 7.62-mm MG.</p> <p>VCC-1: Italian M113 copies are supplemented by this variant</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: .50 SLAP (sabot light armor penetrator) Maximum Aimed Range (m): 2,000 Max Effective Range (m): Day: 2,000 Night: INA Armor Penetration (mm): INA</p> <p>.50 Cal Ball Maximum Aimed Range (m): 2,000 Max Effective Range (m): Day: 1,000 Night: N/A Armor Penetration (mm): INA</p> <p>Other Ammunition Types: Ball-T, Incendiary, I-T, API, API-T</p>	

NOTES

The M113A1 is a variant of the gasoline-powered **M113**. Armors available include Rafael Enhanced Add-on Armor Kit (EAAK), Creusot-Marrel plate armor, and SNPE explosive reactive armor. Thermal and TV sights are also available.

Russian Light Armored Multi-purpose Vehicle MT-LB

	<p>Weapons & Ammunition Types</p> <p>7.62-mm Turret MG Lt Ball, Ball-T, API, API-T, Incendiary</p>	<p>Typical Combat Load</p> <p>2,000</p>
<p>SYSTEM Alternative Designations: MT-LB-T Date of Introduction: 1970, modernized in 1995 Proliferation: At least 9 countries Description: Crew: 2 Troop Capacity: 11 passengers Combat Weight (mt): 11.9 Chassis Length Overall (m): 6.35 Height Overall (m): 1.87 Width Overall (m): 2.85 Ground Pressure (kg/cm²): 0.46 standard track / 0.28 wide track</p> <p>Automotive Performance: Engine Type: 290-hp Diesel Cruising Range (km): 500 Speed (km/h): Max Road: 61.5/70 modernized Max Off-Road: 30/45 modernized Average Cross-Country: INA Max Swim: 3-4 Fording Depth (m): Amphibious</p> <p>Radio: R-123 or upgrade to -123M/-173</p> <p>Protection: Armor, Turret Front (mm): 7-14 Applique Armor (mm): N/A Explosive Reactive Armor (mm): INA Active Protective System: N/A Mineclearing Equipment: N/A Self-Entrenching Blade: Yes NBC Protection System: Collective Smoke Equipment: N/A</p> <p>ARMAMENT Main Armament(s): Caliber, Type, Name: 7.62-mm (7.62x 54R) machinegun, PKT Rate of Fire (rd/min): 250 practical / 650 cyclic, 2-10 round bursts Loader Type: Belt-feed Ready/Stowed Rounds: INA Elevation (°): -5/ +35 Fire on Move: Yes</p> <p>Auxiliary Weapon: N/A ATGM Launcher: N/A</p>	<p>Firing Ports: 1 on each side and 1 in each rear door.</p> <p>FIRE CONTROL FCS Name: INA Main Gun Stabilization: N/A Rangefinder: N/A Infrared Searchlight: N/A Sights w/Magnification: Gunner: Day: PP-61AM, 2.6x Field of View (°): 23 Acquisition Range (m): 1,500 (est) Night: N/A Commander Fire Main Gun: No</p> <p>VARIANTS MT-LB Upgrade: 1995 upgrade includes improved steering and a new engine. 2S1: 122-mm self-propelled howitzer. 9P149/Shturm-S: ATGM launcher vehicle with AT-6 autoloader. MT-LB "blade": Dozer version with a blade attached to the vehicle. MT-LBu: Expanded variant for artillery command and reconnaissance vehicles (ACRVs) and other uses. MT-LBV: Arctic variant with .57m wide track for snow and improved flotation. MTP-LB: Technical support vehicle. MT-SON: Ground surveillance radar vehicle with Pork Trough/SNAR-2 radar. RKhM: Chemical reconnaissance vehicle. SA-13: Regimental surface-to-air missile launcher vehicle. SNAR-10: Ground surveillance radar vehicle with Big Fred radar.</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 7.62-mm API, API-T Maximum Aimed Range (m): 1,500 Max Effective Range (m): Day: 1,000/400-500 on the move Night: INA Tactical AA Range: INA Armor Penetration (mm): 8 (RHA) at 500 m</p> <p>Other Ammunition Types: Light Ball, Ball-T, Heavy Ball, Incendiary</p>	

NOTES

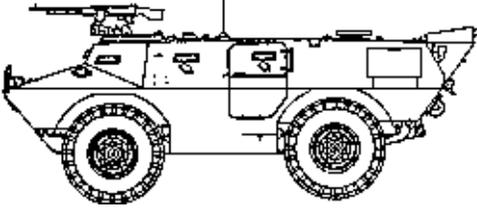
Russian AG-17 30-mm automatic grenade launcher modification is available for use on MT-LB.

Russian KBP offers a drop-in one-man turret, called Kliver, with a stabilized 2A72 30-mm gun, a 4 Kornet ATGM launcher, thermal sights, and improved fire control system.

US Armored Personnel Carrier V-150

	<p>Weapons & Ammunition Types</p>	<p>Typical Combat Load</p>
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Worldwide Equipment Guide

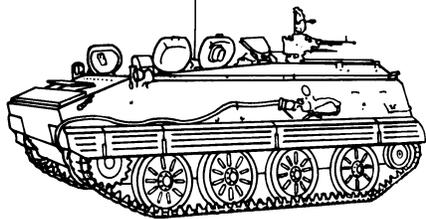
	<p>7.62-mm cupola MG Ball-T, Match API, API-T</p>	<p>3,200</p>
<p>SYSTEM Alternative Designations: Commando Date of Introduction: 1971 Proliferation: At least 20 countries Description: Crew: 3 Troop Capacity: 2 Combat Weight (mt): 9.89 Chassis Length Overall (m): 5.69 Height Overall (m): 1.98 Width Overall (m): 2.26 Ground Pressure (kg/cm²): INA Drive Formula: 4 x 4</p> <p>Automotive Performance: Engine Type: 202-hp Diesel Cruising Range (km): 643 Speed (km/h): Max Road: 89 Max Off-Road: INA Average Cross-Country: INA Max Swim: 5 Fording Depth (m): Amphibious</p> <p>Radio: INA</p> <p>Protection: Armor, Turret Front (mm): Against 7.62-mm ball Applique Armor (mm): N/A Explosive Reactive Armor (mm): N/A Mineclearing Equipment: N/A Self-Entrenching Blade: N/A Active Protective System: N/A NBC Protection System: N/A Smoke Equipment: Optional</p> <p>ARMAMENT Main Armament: Caliber, Type, Name: 7.62-mm (7.62 x 51) MG, FN-MAG (example) Rate of Fire (rd/min): 650-1000 cyclic Loader Type: Belt feed, box magazines Ready/Stowed Rounds: INA Elevation (°): INA Fire on Move: Yes</p> <p>Auxiliary Weapon: N/A</p>	<p>ATGM Launcher: N/A Firing Ports: None</p> <p>FIRE CONTROL FCS Name: N/A Main Gun Stabilization: N/A Rangefinder: N/A Infrared Searchlight: N/A Sights w/Magnification: Gunner: Day: Open ladder sight Field of View (°): INA Acquisition Range (m): 2,000 Night: N/A Commander Fire Main Gun: No</p> <p>VARIANTS Armament options vary widely and include: a turret with 7.62-mm or 12.7-mm MG or turrets with 20-mm, 25-mm, 30-mm, 76-mm, or 90-mm gun. Another turret offers a 12.7-mm MG and 40-mm grenade launcher. An 81-mm self-propelled mortar launcher variant and a TOW ATGM launcher variant are available. Variants include a cargo carrier, police and security vehicles, an air defense variant with 20-mm Vulcan cannon.</p> <p>V-100: This earlier 4x4 APC has a gasoline engine.</p> <p>V-150S: This slightly larger 4x4 variant has improved drive train and the above variety of turret and gun options. A Commando command variant includes a raised compartment area with external-mount 7.62-mm MG. Taiwan has versions with an open-mount 12.7-mm MG and a 107-mm (4.2 inch) mortar.</p> <p>V-200: Variant sold to Singapore with 20-mm turret, 90-mm turret, air defense variant with RBS-70 surface-to-air missile and a recovery variant. Another variant has a 120-mm mortar.</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 7.62-mm Ball, NATO Maximum Aimed Range (m): 2,000 (est) Max Effective Range (m): Day: 1,500 Night: INA Tactical AA Range: INA Armor Penetration (mm): INA</p> <p>Other Ammunition Types: Ball-T, API, API-T, Match</p>	

NOTES

The baseline V-150 is equipped with a variety of pintle-mounted 7.62-mm machineguns. Many MGs are installed by user countries from their inventories. The Belgian FN-MAG general purpose MG is a widely used MG that represents a common capability.

Chinese Armored Personnel Carrier YW-531A

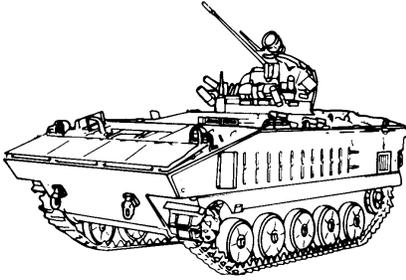
	Weapons & Ammunition Types	Typical Combat Load
	12.7-mm MG	1,120

	<p>APDS, API, API-T, HE-T, HEI</p>	<p>500 620</p>
<p>SYSTEM Alternative Designations: Type 63, North Korean M1967 Date of Introduction: Late 1960s Proliferation: At least 9 countries Description: Crew: 4 Troop Capacity: 10 passengers Combat Weight (mt): 12.60 Chassis Length Overall (m): 5.48 Height Overall (m): 2.85 Width Overall (m): 2.98 Ground Pressure (kg/cm²): 0.44</p> <p>Automotive Performance: Engine Type: 320-hp Diesel Cruising Range (km): 500 Speed (km/h): Max Road: 65 Max Off-Road: 46 Average Cross-Country: INA Max Swim: 6.0 Fording Depths (m): Amphibious</p> <p>Radio: INA</p> <p>Protection: Armor, Turret Front (mm): 14, front glacis Applique Armor (mm): N/A Explosive Reactive Armor (mm): N/A Mineclearing Equipment: N/A Self-Entrenching Blade: N/A Active Protective System: NA NBC Protection System: N/A Smoke Equipment: N/A</p> <p>ARMAMENT Main Armament: Caliber, Type, Name: 12.7-mm (12.7 x 108), heavy MG, Type 54 Rate of Fire (rd/min): 80-100 practical/600 air targets in bursts Loader Type: Belt feed Ready/Stowed Rounds: INA Elevation (°): -4/+82 Fire on Move: Yes</p> <p>Auxiliary Weapon: N/A ATGM Launcher: N/A Firing Ports: 1 on each side, and 1 in the rear</p> <p>FIRE CONTROL FCS Name: N/A</p>	<p>Main Gun Stabilization: N/A Rangefinder: N/A Infrared Searchlight: N/A Sights w/Magnification: Gunner: Day: Open ladder sight, NFI Field of View (°): INA Acquisition Range (m): 2,000 Night: N/A Commander Fire Main Gun: No</p> <p>VARIANTS M1973: North Korean variant, also known as VTT-323, has a turret with twin 14.5-mm guns. Some versions have Susong-Po (AT-3/SAGGER variant) ATGM launcher and SA-7/16 manportable SAMs.</p> <p>Type 54-1: Self-propelled 122-mm open-mount howitzer. Type 70: Variant is a 130-mm (19-tube) multiple rocket launcher. Type YW-304: Self-propelled 82-mm mortar. Type YW-381: Self-propelled 120-mm mortar. YW-750: Ambulance with a similar box compartment YW-531C: This variant has a rectangular, three-sided open-topped shield around the gun, and better vision ports and ventilation. The C, D and E variants differ in intercom sets and firing ports.</p> <p>Type YW-701: Command post variant with a box compartment over rear half of vehicle, and 5 radios. Armament is a 7.62-mm MG.</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 12.7-mm, APDS (Tungsten Core), Type 54 Maximum Aimed Range (m): 2,000 Max Effective Range (m): Day: 1,500 vehicles /1,600 aircraft Night: INA Tactical AA Range: 1,600 Armor Penetration (mm): INA</p> <p>12.7-mm, API, Type 54 Maximum Aimed Range (m): 2,000 Max Effective Range (m): Day: 1,500 unarmored ground / 800 armored Night: INA Tactical AA Range: 1,000 Armor Penetration (mm): 21 (RHA) at 500 m, 13 at 1,000 m</p> <p>Other Ammunition Types: API-T, Russian Duplex, Russian Duplex-T, Incendiary-T, HE-T Type MDZ, HEI Type ZP</p>	

NOTES

Type 54 MG is a Chinese copy of former Soviet 12.7-mm DShKM.

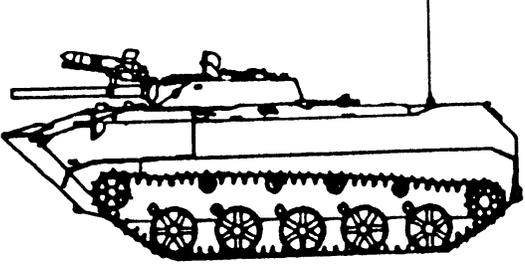
French Infantry Fighting Vehicle AMX-10P

	<p>Weapons & Ammunition Types</p> <p>20-mm Cannon APDS-T, API-T HEI, HEI-T</p> <p>7.62-mm coax MG Tracer, AP, API, Incendiary</p>	<p>Typical Combat Load</p> <p>760 (est) 260 500</p> <p>2,000</p>
	<p>SYSTEM Alternative Designations: INA Date of Introduction: 1973 Proliferation: At least 3 countries Description: Crew: 3 Troop Capacity: 8 passengers Combat Weight (mt): 14.5 Length Overall (m): INA Height Overall (m): 2.57 Width Overall (m): 2.78 Ground Pressure (kg/cm²): 0.53</p> <p>Automotive Performance: Engine Type: 300-hp Diesel Cruising Range (km): 600 Speed (km/h): Max Road: 65 Max Off-Road: INA Average Cross-Country: INA Max Swim: 7 Fording Depths (m): Amphibious Mineclearing Equipment: N/A Self-Entrenching Blade: N/A</p> <p>Radio: INA</p> <p>Protection: Armor, Turret Front (mm): 12.7-mm frontal Applique Armor (mm): N/A Explosive Reactive Armor (mm): Available Active Protective System: N/A NBC Protection System: Yes Smoke Equipment: 4 smoke grenade launchers</p> <p>ARMAMENT Caliber, Type, Name: 20-mm automatic cannon M693 F1 Rate of Fire (rd/min): 740 Loader Type: Dual belt feed Ready/Stowed Rounds: INA Elevation (°): -8/+50 Fire on Move: INA</p> <p>Auxiliary Weapon: Caliber, Type, Name: 7.62-mm (7.62 x 51) MG, AAT 52 NF1 Mount Type: Coax Maximum Aimed Range (m): INA</p> <p>Max Effective Range: Day: INA Night: INA Fire on Move: Yes Rate of Fire (rd/min): INA</p> <p>ATGM Launcher: N/A Firing Ports: None</p> <p>FIRE CONTROL FCS Name: INA Main Gun Stabilization: INA Rangefinder: INA Infrared Searchlight: Yes Sights w/Magnification: Gunner: Day: OB 40 Day/ night sight Field of View (°): INA Acquisition Range (m): INA Night: OB 40 Day/ night sight Field of View (°): INA Acquisition Range (m): INA Commander Fire Main Gun: No</p> <p>VARIANTS AMX-10P: Variant with Milan or HOT ATGM launcher AMX-10P/Milan: ATGM launcher vehicle, with two launchers AMX/HOT: ATGM launcher vehicle (Toucan II turret, 4 launchers) AMX-10 TM: Mortar carrier towing 120-mm RT-61 mortar AMX-10 PAC 90: Fire support/AT variant with Giat 90-mm gun AMX-10P Marine: Improved swim variant w/ 12.7/25/90-mm gun AMX-10 PC: Command variant with varied command stations AMX-10 RC: Wheeled (6 x 6) fire support vehicle with 90-mm gun AMX-10 RAC: The same fire support chassis with 105-mm gun</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 20-mm (20x139) APDS-T Maximum Aimed Range (m): INA Max Effective Range (m): Day: 1,300 Night: INA Tactical AA Range: INA Armor Penetration (mm): INA</p> <p>Other Ammunition Types: API, API-T, HEI, HEI-T</p>	

NOTES

A French SNPE explosive reactive armor (ERA) kit and others are available for use on the AMX-10P. However, during dismounted troop movement, ERA would be a hazard. Thus, passive armor is more likely; and ERA application is doubtful.

Russian Airborne Fighting Vehicle BMD-1

	<p>Weapons & Ammunition Types</p> <p>73-mm gun HEAT HE</p> <p>AT-3/a/b/c/Imp ATGM HEAT HE</p> <p>7.62-mm coax MG 2x 7.62-mm bow MG</p>	<p>Typical Combat Load</p> <p>40 (est) 16 24</p> <p>4 3 1</p> <p>2,000 4,000</p>
	<p>SYSTEM Alternative Designations: Date of Introduction: 1969 Proliferation: At least 1 country Description: Crew: 2 Troop Capacity: 5 passengers (+1) Combat Weight (mt): 13.3 Chassis Length Overall (m): 6.74 Height Overall (m): 2.15 Width Overall (m): 2.94 Ground Pressure (kg/cm²): 0.57</p> <p>Automotive Performance: Engine Type: 240-hp Diesel Cruising Range (km): 600 Speed (km/h): Max Road: 65 Max Off-Road: 40-45 Average Cross-Country: INA Max Swim: 7 Fording Depth (m): Amphibious</p> <p>Radio: R-123M</p> <p>Protection: Armor, Turret Front (mm): 23 or Antibullet Applique Armor (mm): See NOTES Explosive Reactive Armor (mm): See NOTES Active Protective System: N/A Mineclearing Equipment: N/A Self-Entrenching Blade: N/A NBC Protection System: Collective Smoke Equipment: VEES</p> <p>ARMAMENT Main Armament: Caliber, Type, Name: 73-mm smoothbore gun, 2A28/Grom Rate of Fire(rd/min): 7-8 Loader Type: Autoloader Ready/Stowed Rounds: 40 / 0 Elevation (°): -4/ +33 Fire on Move: Yes, but only 10 km/h or less (est)</p> <p>Auxiliary Weapons: Caliber, Type, Name: 7.62-mm (7.62x 54R) machinegun, PKT Mount Type: Coax Maximum Aimed Range (m): 1,300 Max Effective Range (m): Day: 1,000/400-500 on the move Night: 800</p> <p>Fire on Move: Yes Rate of Fire (rd/min): 250 practical / 650 cyclic, 2-10 round bursts Caliber, Type, Name: 7.62-mm machinegun, PKT Mount Type: Bow (ball-mounted) Maximum Aimed Range (m): 1,000 Max Effective Range (m): Day: 1,000/ 400-500 on the move Night: N/A</p> <p>Fire on Move: Yes Rate of Fire (rd/min): 250 practical / 650 cyclic, 2-10 round bursts</p> <p>ATGM Launcher: Name: 9P111 Launch Method: Rail-launched Guidance: MCLoS Command Link: Wire Launcher Dismountable: Yes</p> <p>Firing Ports: 1 on each side, 1 in left rear door</p> <p>FIRE CONTROL FCS Name: INA Main Gun Stabilization: N/A Rangefinder: Stadiametric Infrared Searchlight: Yes Sights w/Magnification: Gunner: Day: 1PN22M1, 8x Field of View (°): 15 Acquisition Range (m): Night: 1PN22M1, 6.7x Field of View (°): 6 Acquisition Range (m): 800-1,000, based on light Commander Fire Main Gun: No</p> <p>VARIANTS BMD-1K: Command IFV (FSU), with added R-126 and R-107. BMD-1M: Variant with improved ventilation and road wheels. BMD-1P: Widely fielded IFV with AT-4/5 replacing AT-3. BMD-1PK: Company commander variant (FSU) of BMD-1P. BMD-2: Widely fielded variant with a 30-mm automatic gun and with AT-3 ATGM launcher replaced by AT-4/5 ATGM launcher. BTR-D: Stretched (6-road wheel) armored multipurpose transporter variant, with two 7.62-mm MGs but no turret. This chassis has been used for a variety of other airborne vehicles.</p>	

Russian Airborne Fighting Vehicle BMD-1 continued

Worldwide Equipment Guide

<p>MAIN ARMAMENT AMMUNITION</p> <p>Caliber, Type, Name: 73-mm HEAT-FS, PG-9</p> <p>Maximum Aimed Range (m): 1,300 Max Effective Range (m): Day: 800, but 600 or less on the move Night: 800 Tactical AA Range: INA Armor Penetration (mm): 335 (RHA)</p> <p>73-mm HEAT-FS, NFI</p> <p>Maximum Aimed Range (m): 1,300 Max Effective Range (m): Day: 1,000, but 600 or less on the move Night: 800-1,000 Tactical AA Range: INA Armor Penetration (mm): >400 (RHA)</p> <p>73-mm HE, OG-9</p> <p>Maximum Aimed Range (m): 1,300, 600 or less on the move Max Effective Range (m): Day: 1,300, but 600 or less on the move Night: 800-1,000 Tactical AA Range: INA Armor penetration (mm): INA</p> <p>73-mm HE, OG-9M1</p> <p>Maximum Aimed Range (m): 4,500 Max Effective Range (m): Day: 1,300, but 600 or less on the move Night: 800-1,000 Tactical AA Range: INA Armor Penetration (mm): INA</p> <p>Other Ammunition Types: OG-9M</p>	<p>Antitank Guided Missiles:</p> <p>Name: AT-3, -3A, -B Warhead Type: Tandem HEAT Armor Penetration (mm): 410 RHA Range (m): 3,000</p> <p>Name: AT-3C Warhead Type: Tandem HEAT Armor Penetration (mm): 520 RHA Range (m): 3,000</p> <p>Name: AT-3C Imp/ Polk (Slovenian) Warhead Type: Precursor with HEAT Armor Penetration (mm): 580 RHA Range (m): 3,000</p> <p>Name: Malyutka-2 (Russian) Warhead Type: Tandem HEAT Armor Penetration (mm): 800 RHA Range (m): 3,000</p> <p>Name: Malyutka HE (Russian) Warhead Type: Frag-HE Armor Penetration (mm): N/A Range (m): 3,000</p>
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NOTES

Vehicle can be parachute landed with airborne troops onboard. Height can be lowered.

Russian KBP offers a drop-in one-man turret, called Kliver, with a stabilized 2A72 30-mm gun, a 4-Kornet ATGM launcher, thermal sights, and improved fire control system. The Russian Volgograd Tractor Plant offers the B30 turret (a drop-in one-man turret with 2A42 30-mm gun, 7.62-mm coax MG, and a 9P135M launcher for AT-4/-5 ATGM). A Russian AG-17 30-mm automatic grenade launcher is available for BMD-1.

Other options are spall liners, air conditioning, and a more powerful engine. A French SNPE explosive reactive armor (ERA) kit and others are available for use on the BMD-1. However, during dismounted troop movement, ERA would be a hazard. Thus, passive armor is more likely; and ERA application is doubtful. For amphibious use, additional armor application is unlikely.

The Slovenian TS-M ATGM thermal night sight has a detection range of 4,500m and a recognition range of 2,000m.

The AT-3 HE-Blast ATGM is used for killing personnel and destroying bunkers and other fortifications.

The AT-3C Polk features a nose probe, an improved motor for increased velocity, lower smoke noise signature and a SACLOS launcher with improved sights.

Worldwide Equipment Guide

<p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 30-mm AP-T Maximum Aimed Range (m): 2,500 Max Effective Range (m): Day: 1,500 Night: INA Tactical AA Range: 4,000 Armor Penetration (mm): 18 (RHA) at 1,500m</p> <p>30-mm APDS Maximum Aimed Range (m): 2,500 Max Effective Range (m): Day: 2,000 Night: INA Tactical AA Range: 4,000 Armor Penetration (mm): 25 (RHA) at 1,500m</p> <p>30-mm APFSDS-T M929 Maximum Aimed Range (m): 2,500 Max Effective Range (m): Day: 2,000+ Night: INA Tactical AA Range: 4,000 Armor penetration (mm): 55 (RHA) at 1,000m, 45 at 2,000m</p>	<p>30-mm Frag-HE Maximum Aimed Range (m): 4,000 Max Effective Range (m): Day: 4,000 Night: INA Tactical AA Range: 4,000 Armor Penetration (mm): INA</p> <p>Other Ammunition Types: 30-mm HEI-T</p> <p>Antitank Guided Missiles: Name: AT-5B/Konkurs-M Warhead Type: Tandem shaped charge (HEAT) Armor Penetration (mm): 925 (RHA) Range (m): 4,000</p> <p>Name: AT-5/Spandrel Warhead Type: Shaped charge (HEAT) Armor Penetration (mm): 650 (RHA) Range (m): 4,000</p>
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BMD-3 has variable height control.

Automatic grenade launcher has 290 ready rounds and 261 in the rack. The ATGM launcher has 3 ready rounds (one on the launcher), and two stowed.

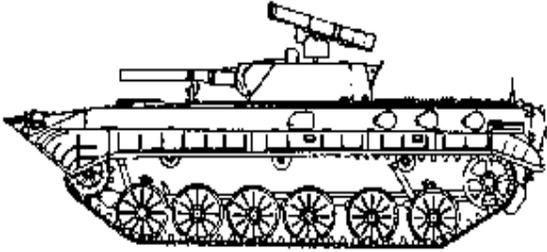
A French SNPE explosive reactive armor (ERA) kit and others are available for use on the BMD-3. However, during dismounted troop movement, ERA would be a hazard. Thus, passive armor is more likely and ERA application is doubtful. For amphibious use, additional armor application is unlikely. Other options are spall liners, air conditioning, and a more powerful engine.

The Russian SANOET-1 thermal gunner's sight is available. Thermal sights are available for the ATGM launcher. The Russian Trakt/IPN65 thermal imaging ATGM night sight is optional. Acquisition range is 2,500 m (NFI). For the ATGM launcher in dismount configuration, the Russian Mulat/IPN86 lightweight thermal ATGM night sight has 3,600 m detection range and 2,000 m identification range.

French-German Flame-V adapter kit permits the BMD-3 to launch Milan, Milan-2 and Milan-3 ATGMs.

Russian KBP offers a drop-in one-man turret, called Kliver, with a stabilized 2A72 30-mm gun, a 4 Kornet ATGM launcher, thermal sights, a coaxial 7.62-mm MG and improved fire control system.

Russian Infantry Fighting Vehicle BMP-1P

	<p>Weapons & Ammunition Types</p> <p>73-mm gun HEAT-FS HE</p> <p>ATGM AT-4/-4B/-5/-5B</p> <p>7.62-mm coax MG</p>	<p>Typical Combat Load</p> <p>40 (est) 16 24</p> <p>4</p> <p>2,000</p>
<p>SYSTEM Alternative Designations: BWP-1 (Poland), see NOTES Date of Introduction: 1974 Proliferation: At least 7 countries Description: Crew: 3 Troop Capacity: 6 passengers Combat Weight (mt): 13.3 Chassis Length Overall (m): 6.74 Height Overall (m): 2.15 Width Overall (m): 2.94 Ground Pressure (kg/cm²): 0.57</p> <p>Automotive Performance: Engine Type: 300-hp Diesel Cruising Range (km): 600 Speed (km/h): Max Road: 65 Max Off-Road: 40-45 Average Cross-Country: INA Max Swim: 7 Fording Depth (m): Amphibious</p> <p>Radio: R-123, or R-173</p> <p>Protection: Armor, Turret Front (mm): 19-23 Applique Armor (mm): N/A Explosive Reactive Armor (mm): Available Active Protective System: N/A Mineclearing Equipment: KMT-8 plow available Self-Entrenching Blade: N/A NBC Protection System: Collective Smoke Equipment: Six 81-mm smoke grenade launchers, VEES</p> <p>ARMAMENT Main Armament: Caliber, Type, Name: 73-mm smoothbore gun 2A28/Grom Rate of Fire (rd/min): 7-8 Loader Type: Autoloader Ready/Stowed Rounds: 40 / 0 Elevation (°): -4/+33 Fire on Move: Yes, but only 10 km/h or less (est)</p> <p>Auxiliary Weapon: Caliber, Type, Name: 7.62-mm (7.62x 54R) machinegun, PKT Mount Type: Coax Maximum Aimed Range (m): 1,300 Max Effective Range (m): Day: 1,000 / 400-500 on the move Night: 800 Fire on Move: No Rate of Fire (rd/min): 250 practical / 650 cyclic, 2-10 round bursts</p>	<p>ATGM Launcher: Name: 9P135M2 Launch Method: Tube-launched Guidance: SACLOS Command Link: Wire Launcher Dismountable: Yes</p> <p>Firing Ports: 4 on each side, 1 in left rear door</p> <p>FIRE CONTROL FCS Name: 1PN22M1 Main Gun Stabilization: N/A Rangefinder: Stadiametric Infrared Searchlight: OU-3GK Sights w/Magnification: Gunner: Day: 1PN22M1, 8 x Field of View (°): 15 Acquisition Range (m): 1,300 Night: 1PN22M1, 6.7x Field of View (°): 6 Acquisition Range (m): 800-1,000 based on light</p> <p>Commander Fire Main Gun: No</p> <p>VARIANTS BMP-1PG: This recently offered Russian upgrade is similar to BMP-1P with an added AG-17 30-mm automatic grenade launcher and other options, including thermal sights.</p> <p>BMP-1PK: Command variant, with addition of R-126 and R-107 transceiver. A small telescoping antenna is mounted on right rear. Firing ports and telescopes on right side are blocked off.</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 73-mm HEAT-FS, PG-9 Maximum Aimed Range (m): 1,300 Max Effective Range (m): Day: 800, but 600 or less on the move in 2-4 round bursts Night: 800-1,000 Tactical AA Range: INA Armor Penetration (mm): 335 (RHA)</p> <p>73-mm HEAT-FS, NFI Maximum Aimed Range (m): 1,300 Max Effective Range (m): Day: 1,000 / 600 or less on the move Night: 800-1,000 Tactical AA Range: INA Armor Penetration (mm): >400 (RHA)</p>	

Russian Infantry Fighting Vehicle BMP-1P continued

Worldwide Equipment Guide

<p>73-mm HE, OG-9M1 Maximum Aimed Range (m): 4,500 Max Effective Range (m): Day: 1,300/ 600-1,000 on the move Night: 800-1,000 Tactical AA Range: INA Armor penetration (mm): INA</p> <p>Other Ammunition Types: OG-9, OG-9M</p> <p>Antitank Guided Missiles: Name: AT-5/SPANDREL Warhead Type: Shaped charge (HEAT) Armor Penetration (mm): 650 (RHA) Range (m): 4,000</p>	<p>Name: AT-5B/Konkurs-M Warhead Type: Tandem shaped charge (HEAT) Armor Penetration (mm): 925 (RHA) Range (m): 4,000</p> <p>Name: AT-4/SPIGOT Warhead Type: Shaped charge (HEAT) Armor Penetration (mm): 480 (RHA) Range (m): 2,000</p> <p>Name: AT-4B/Factoria Warhead Type: Tandem Shaped charge (HEAT) Armor Penetration (mm): 550 (RHA) Range (m): 2,500</p>
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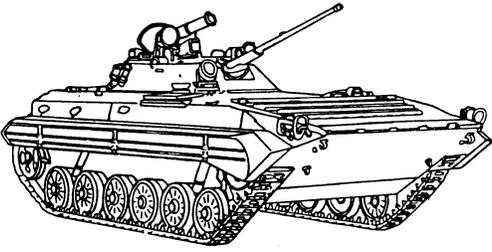
The prototype IFV, known as BMP, was not fielded. Initial BMP production variant, BMP-A, was halted with insignificant numbers. The baseline production IFV, BMP-1, has an AT-3/SAGGER antitank guided missile. The BMP-1P upgrade is widely fielded, with an AT-4/-5 ATGM launcher replacing the AT-3 launcher. The vehicle also added smoke grenade launchers. This variant should generally be portrayed where OPFOR calls for the BMP-1. For applications where a robust and modernized OPFOR is expected, use AT-5B ATGM. The AT-4/-4B ATGMs are less likely to be employed on this vehicle.

Other options are spall liners, air conditioning, and a more powerful engine. A French SNPE explosive reactive armor (ERA) kit and others are available for use on the BMD-1. However, during dismounted troop movement, ERA would be a hazard. Thus, passive armor is more likely; and ERA application is doubtful. Additional armor application may jeopardize amphibious capability.

Russian AG-17 30-mm automatic grenade launcher modification is available for use on BMP-1P. Russian KBP offers a drop-in one man turret, called Kliver, with a stabilized 2A72 30-mm gun, a 4 Kornet ATGM launcher, thermal sights, and improved fire control system.

The Russian Alis thermal gunner's sight is available. The Slovenian TS-F ATGM thermal night sight has a detection range of 4,500 m and a recognition range of 2,000 m.

Russian Infantry Fighting Vehicle BMP-2

	<p>Weapons & Ammunition Types</p> <p>30-mm automatic gun HEI-T, Frag-HE AP-T, APDS-T, APFSDS-T</p> <p>ATGM AT-5/-5B/-4/-4B</p> <p>7.62-mm coax MG</p>	<p>Typical Combat Load</p> <p>500 340 160</p> <p>5</p> <p>2,000</p>
	<p>SYSTEM Alternative Designations: Yozh (Russia), Sarath (India) Date of Introduction: 1980 Proliferation: At least 20 countries Description: Crew: 3 Troop Capacity: 7 passengers Combat Weight (mt): 14.3 Chassis Length Overall (m): 6.72 Height Overall (m): 2.45 Width Overall (m): 3.15 Ground Pressure (kg/cm²): 0.63</p> <p>Automotive Performance: Engine Type: 300-hp Diesel Cruising Range (km): 600 Speed (km/h): Max Road: 65 Max Off-Road: 45 Average Cross-Country: 35 Max Swim: 7 Fording Depth (m): Amphibious</p> <p>Radio: R-123M transceiver or R-173</p> <p>Protection: Armor, Turret Front (mm): 23-33 Applique Armor (mm): On BMP-2D Explosive Reactive Armor (mm): Available, see NOTES Active Protective System: N/A Mineclearing Equipment: KMT-8 mine plow available Self-Entrenching Blade: N/A NBC Protection System: Collective Smoke Equipment: 6 smoke grenade launchers, VEES</p> <p>ARMAMENT Main Armament: Caliber, Type, Name: 30-mm automatic gun, 2A42 Rate of Fire (rd/min): 550 cyclic in bursts/ 200-300 practical Loader Type: Dual-belt feed Ready/Stowed Rounds: 500/0 Elevation (°): -5 to +74 Fire on Move: Yes</p> <p>Auxiliary Weapon: Caliber, Type, Name: 7.62-mm (7.62x 54R) machinegun, PKT Mount Type: Turret coax Maximum Aimed Range (m): 2,000</p> <p>Max Effective Range (m): Day: 1,000 Night: INA Fire on Move: Yes Rate of Fire (rd/min): 250 practical/650 cyclic, 2-10 round bursts</p> <p>ATGM Launcher: Name: 9P135M1/M3 Launch Method: Tube-launched Guidance: SACLOS Command Link: Wire Launcher Dismountable: Yes</p> <p>Firing Port: 4 on left side, 3 on right side 1 in left rear door</p> <p>FIRE CONTROL FCS Name: BPK-1-42 or BPK-2-42 Main Gun Stabilization: 2-plane Rangefinder: Laser Infrared Searchlight: Yes Sights w/Magnification: Gunner: Day: BPK-1-42 or BPK-2-42 Field of View (°): 8 Acquisition Range (m): 2,500-4,000 (est) Night: BPK-1-42 or BPK-2-42 II/IR Field of View (°): INA Acquisition Range (m): INA Commander Fire Main Gun: No</p> <p>VARIANTS BMP-2D: Variant with add-on plate armor, but which cannot swim BMP-2E: Variant with 6-mm steel plates added and track skirts BMP-2K: Command variant with additional radio</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 30-mm AP-T Maximum Aimed Range (m): 2,500 Max Effective Range (m): Day: 1,500 Night: INA Tactical AA Range: 4,000 Armor Penetration (mm): 18 (RHA, 60°) at 1,500 m</p>	

Russian Infantry Fighting Vehicle BMP-2 continued

Worldwide Equipment Guide

<p>30-mm APDS Maximum Aimed Range (m): 2,500 Max Effective Range (m): Day: 2,000 Night: INA Tactical AA Range: 4,000 Armor Penetration (mm): 25 (RHA) at 1,500m</p> <p>30-mm APFSDS-T M929 Maximum Aimed Range (m): 2,500 Max Effective Range (m): Day: 2,000+ Night: INA Tactical AA Range: 4,000 Armor penetration (mm): 55 (RHA) at 1,000m/45 at 2,000m</p> <p>30-mm Frag-HE Maximum Aimed Range (m): 4,000/ 2,500 point target Max Effective Range (m): Day: 4,000 Night: INA Tactical AA Range: 4,000 Armor Penetration (mm): INA</p> <p>Other Ammunition Types: 30-mm HEI-T</p>	<p>Antitank Guided Missiles: Name: AT-5/SPANDREL Warhead Type: Shaped charge (HEAT) Armor Penetration (mm): 650 (RHA) Range (m): 4,000</p> <p>Name: AT-5B/Konkurs-M Warhead Type: Tandem shaped charge (HEAT) Armor Penetration (mm): 925 (RHA) Range (m): 4,000</p> <p>Name: AT-4/SPIGOT Warhead Type: Shaped charge (HEAT) Armor Penetration (mm): 480 (RHA) Range (m): 2,000</p> <p>Name: AT-4B/Factoria Warhead Type: Tandem shaped charge (HEAT) Armor Penetration (mm): 550 (RHA) Range (m): 2,500</p>
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A French SNPE explosive reactive armor (ERA) kit and others are available for use on the BMP-2. However, during dismounted troop movement, ERA would be a hazard. Thus, passive armor is more likely and ERA application is doubtful. For amphibious use, additional armor application is unlikely. Other options are spall liners, air conditioning, and a more powerful engine.

Russian AG-17 30-mm automatic grenade launcher modification is offered for BMP-2.

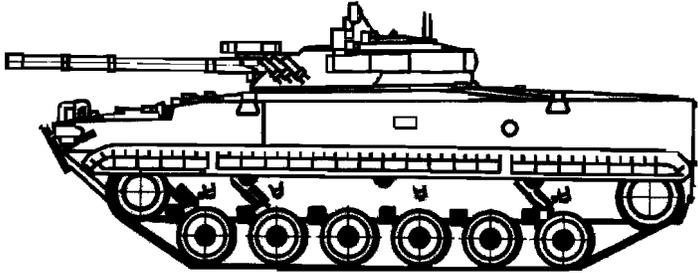
Russian KBP offers a drop-in one-man turret, called Kliver, with a stabilized 2A72 30-mm gun, a 4 Kornet ATGM launcher, thermal sights, a coaxial 7.62-mm MG and improved fire control system.

ATGM load consists of one ready on the launcher and four stowed. They are readily accessible, but require hand loading from an open hatch. The AT-5 and AT-5B are more likely than AT-4 and -4B.

French-German Flame-V adaptor kit permits the BMP-2 system to launch Milan, Milan-2, and Milan-3 ATGMs.

Thermal sights are available. The Russian SANOET-1 thermal gunner's sight is available. The Russian Trakt/IPN65 thermal imaging (TI) ATGM night sight is optional. Acquisition range is 2,500 m (NFI). For the launcher in dismount configuration, the Slovenian TS-F ATGM night sight is available and has a detection range of 4,500 m and recognition range of 2,000 m. The Russian Mulat/IPN86 lightweight TI ATGM thermal sight has 3,600 m detection range and 2,000 m identification range.

Russian Infantry Fighting Vehicle BMP-3

	<p>Weapons & Ammunition Types</p> <p>100-mm rifled gun Frag-HE 40 AT-10/Imp ATGM 8</p> <p>30-mm automatic gun HEI-T, Frag-HE 340 AP-T, APDS-T or APFSDS-T 160</p> <p>7.62-mm coax MG 2,000</p> <p>2 x 7.62-mm bow MG 4,000</p>	<p>Typical Combat Load</p> <p>40</p> <p>500</p> <p>2,000</p> <p>4,000</p>
	<p>SYSTEM Alternative Designations: Soviet ICV M1990/1 Date of Introduction: 1990 Proliferation: At least 7 countries Description: Crew: 3 Troop Capacity: 7 passengers Combat Weight (mt): 18.70 Chassis Length Overall (m): 6.73 Height Overall (m): 2.45 Width Overall (m): 3.15 Ground Pressure (kg/cm²): 0.62</p> <p>Automotive Performance: Engine Type: 500-hp Diesel Cruising Range (km): 600 Speed (km/h): Max Road: 70 Max Off-Road: 45 Average Cross-Country: 35 Max Swim: 10 Fording Depth (m): Amphibious</p> <p>Radio: R-173, R-173P</p> <p>Protection: Armor, Turret Front (mm): 30-35 front glacis Applique Armor (mm): Yes on turret Explosive Reactive Armor (mm): Available, see NOTES Active Protective System: N/A Mineclearing Equipment: KMT-8 plow available Self-Entrenching Blade: Yes NBC Protection System: Collective Smoke Equipment: 6 smoke grenade launchers, VEES</p> <p>ARMAMENT Main Armaments: Caliber, Type, Name: 100-mm rifled gun 2A70 Rate of Fire (rd/min): 8-10 Loader Type: Autoloader gun rounds; manual for gun and ATGMs Ready/Stowed Rounds: 22/18 for rounds, 3/5 for ATGMs Elevation (°): -5 to +60 Fire on Move: Yes</p> <p>Caliber, Type, Name: 30-mm automatic gun 2A72 Rate of Fire: 350 rd/min (cyclic) in bursts Loader Type: Dual-belt feed Ready/Stowed Rounds: 500/0</p> <p>Elevation (°): -5 to +60 Fire on Move: Yes</p> <p>Auxiliary Weapon: Caliber, Type, Name: 7.62-mm (7.62x 54R) machinegun, PKT Mount Type: Turret coax Maximum Aimed Range (m): 2,000 Max Effective Range (m): Day: 1,000 Night: INA Fire on Move: Yes Rate of Fire (rd/min): 250 practical / 650 cyclic, in 2-10 round bursts</p> <p>Caliber, Type, Name: 7.62-mm (7.62x 54R) machinegun, PKT Mount Type: Bow left and right Maximum Aimed Range (m): 1,000 Max Effective Range (m): Day: 1,000/400-500 on the move Night: N/A Fire on Move: Yes Rate of Fire (rd/min): 250 practical / 650 cyclic, in 2-10 round bursts</p> <p>ATGM Launcher: Name: 2A70 100-mm gun Launch Method: Gun-launched Guidance: SACLOS, laser-beam rider Command Link: Encoded infrared laser-beam Launcher Dismountable: No</p> <p>Firing Ports: 2 on each side, 1 in left rear door</p> <p>FIRE CONTROL FCS Name: 1K13-2 Main Gun Stabilization: 2-plane Rangefinder: Laser Infrared Searchlight: Yes Sights w/Magnification: Gunner: Day: 1K13-2, 8x ; 1P3-10 antiaircraft, 2.6x; PPD-1 stand-by Field of View (°): INA Acquisition Range (m): 5,200 Night: 1K13-2 II night channel, 5.5x Field of View (°): INA Acquisition Range (m): INA Commander Fire Main Gun: Yes</p>	

Russian Infantry Fighting Vehicle BMP-3 continued

Worldwide Equipment Guide

<p>VARIANTS</p> <p>BMP-3F: Amphibious Armored Combat Vehicle developed for Naval Infantry.</p> <p>BMP-3 M1995: ATGM launcher vehicle, with Kornet (AT-14) launcher and autoloader, and thermal sights.</p> <p>9P157: ATGM launcher vehicle, with Krizantema (AT-15) ATGM autoloader, MMW and thermal fire control system.</p> <p>BMP-3K: Command variant, with electronic round fuze system for 100-mm gun. Bow MGs are removed. Added radios are R-159, R-143 and R-174.</p> <p>BREhM-L: Armored recovery vehicle (ARV).</p> <p>BRM-3K: Combat recon vehicle with radar and 30-mm gun.</p> <p>BMP-3: UAE upgrade improvements including Namut Thermal Night sight.</p> <p>MAIN ARMAMENT AMMUNITION</p> <p>Caliber, Type, Name: 100-mm HE 3UOF17 Maximum Aimed Range (m): 5,000 Max Effective Range (m): Day: 4,000 Night: INA Tactical AA Range: 4,000 Armor Penetration (mm): 25 (RHA)</p> <p>Caliber, Type, Name: 100-mm HE-Shapnel (HEF/MOD.96) Focused-fragmentation, electronically-fuzed Maximum Aimed Range (m): 5,200 Max Effective Range (m): Day: 5,200 Night: INA Tactical AA Range: 4,000 Armor Penetration (mm): INA</p> <p>30-mm APFSDS-T M929 Maximum Aimed Range (m): 2,500 Max Effective Range (m): Day: 2,000+ Night: INA Tactical AA Range: 4,000 Armor penetration (mm): 55 (RHA) at 1,000 m, 45 at 2,000 m</p>	<p>30-mm Frag-HE Maximum Aimed Range (m): 4,000 Max Effective Range (m): Day: 4,000 Night: INA Tactical AA Range: 4,000 Armor Penetration (mm): INA</p> <p>30-mm AP-T Maximum Aimed Range (m): 2,500 Max Effective Range (m): Day: 1,500 Night: INA Tactical AA Range: 4,000 Armor Penetration (mm): 18 (RHA, 60°) at 1,500 m</p> <p>30-mm APDS Maximum Aimed Range (m): 2,500 Max Effective Range (m): Day: 2,000 Night: INA Tactical AA Range: 4,000 Armor Penetration (mm): 25 (RHA) at 1,500 m</p> <p>Other Ammunition Types: 100-mm HE-I, 30-mm HEI-T</p> <p>Antitank Guided Missiles Name: AT-10/Basnya Warhead Type: Shaped charge Command Link: Encoded laser-beam Warhead Type: Shaped charge (HEAT) Armor Penetration (mm): 650 (RHA) Range (m): 4,000</p> <p>Name: AT-10 Improved Warhead Type: Tandem shaped charge Armor Penetration (mm): 700 (RHA) behind ERA Range (m): 4,000 Launcher Dismountable: No</p>
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A French SNPE ERA kit and others are available for use on the BMP-3. However, during dismounted troop movement ERA would be a hazard. Thus, passive armor is more likely and ERA application is doubtful. Other options are spall liners and air conditioning.

Russian AG-17 30-mm automatic grenade launcher modification is available for use on BMP-3.

Russian KBP offers a drop-in one-man turret called Kliver, with a stabilized 2A72 30-mm gun, a 4 Kornet ATGM launcher, thermal sights, and improved fire control system.

The Namut thermal gunner's sight is available for use on BMP-3. This uses the French Athos thermal camera. Namut sight has 3x and 10x channels. Night acquisition range: 2,600 m (NFI)

Stowed rounds and ATGMs can be passed from the passenger compartment to the gunner for hand loading. This includes ATGMs.

The "HEF" (or "HE-Shrapnel") round can be employed in indirect fire mode with air burst to 7,000 m.

British Infantry Fighting Vehicle Warrior

	<p>Weapons & Ammunition Types</p> <p>30-mm auto gun HEI-T APDS-T, APSE-T</p> <p>7.62-mm coax MG Ball, Ball-T</p>	<p>Typical Combat Load</p> <p style="text-align: right;">228</p> <p style="text-align: right;">2,200</p>
<p>SYSTEM Alternative Designations: FV 511, MCV-80 Date of Introduction: 1988 Proliferation: At least two countries Description: Crew: 3 Troop Capacity: 7 passengers Combat Weight (mt): 24.00 Chassis Length Overall (m): 6.34 Height Overall (m): 2.79 Width Overall (m): 3.03 Ground Pressure (kg/cm²): 0.65</p> <p>Automotive Performance: Engine Type: 550-hp Diesel Cruising Range (km): 660 Speed (km/h): Max Road: 75 Max Off-Road: 60 Cross-Country: 48 Max Swim: N/A Fording Depth (m): 1.3 Unprepared</p> <p>Radio: INA</p> <p>Protection: Armor, Turret Front (mm): Against 14.5-mm gun Applique Armor (mm): Available (see VARIANTS) Explosive Reactive Armor (mm): N/A Active Protective System: N/A Mineclearing Equipment: N/A Self-Entrenching Blade: N/A NBC Protection System: Yes Smoke Equipment: Smoke grenade launchers (4 each side of turret)</p> <p>ARMAMENT Main Armament: Caliber, Type, Name: 30-mm automatic cannon, RARDEN L21A1 Rate of Fire (rd/min): 80-90 cyclic Loader Type: Feed tray, clip-fed (3-round clips) Ready/Stowed Rounds: 228/0 Elevation (°): -10/+45 Fire on Move: INA</p> <p>Auxiliary Weapon: Caliber, Type, Name: 7.62-mm chain gun, L94A1 Mount Type: Turret coax Maximum Aimed Range (m): INA Max Effective Range: INA</p>	<p>Fire on Move: Yes Rate of Fire (rd/min): 520-570</p> <p>ATGM Launcher: N/A Firing Ports: None</p> <p>FIRE CONTROL FCS Name: INA Main Gun Stabilization: N/A Rangefinder: INA Infrared Searchlight: Yes Sights w/Magnification: Gunner: Day: INA Field of View (°): INA Acquisition Range (m): INA Night: SPAV L2A1 II sight Field of View (°): INA Acquisition Range (m): INA Commander Fire Main Gun: No</p> <p>VARIANTS Command variant is outfitted with radios, mapboards, other staff support equipment, and Vickers Defence Turret.</p> <p>Desert Warrior: Variant with the 2-man turret from LAV-25, with a US M242 Bushmaster 25-mm automatic cannon, coaxial MG and 1-2 ATGM launchers. Other modifications are additional passive armor and three periscopes for improved vision. Sold to Kuwait.</p> <p>Desert Storm Variant: Changes included passive armor added to hull sides and a pintle mount for a Milan-2 ATGM launcher.</p> <p>Mechanized Artillery Observation Vehicle (MAOV): It resembles an IFV, but is fitted with a dummy cannon, improved artillery reconnaissance and automation systems, and land navigation. Options include an Osprey 8-power optical and thermal sight with Nd:YAG laser designator for the observer.</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 30-mm APDS-T, L14 Maximum Aimed Range (m): 4,000 Max Effective Range (m): Day: 1,100 Night: INA Armor Penetration (mm): INA</p> <p>Other Ammunition Types: 30-mm APSE-T (AP Secondary Effects-T L5, HEI-T L13</p>	

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Variants available but not in production include engineer, recovery, mortar vehicles, armored fighting vehicles with 90-mm and 105-mm guns, an APC with 7.62-mm chain gun, ATGM launcher vehicles for Milan, HOT and Trigat, and a low-profile chassis for a reduced signature IFV.

Chapter 3 Reconnaissance Vehicles

The modern battlefield is becoming increasingly mobile and lethal. The challenge for reconnaissance systems is to acquire the enemy, transmit intelligence, and survive for the next mission. Therefore, ground forces use specialized reconnaissance vehicles. Most will employ a mix of systems, including tanks and infantry fighting vehicles, dismounted reconnaissance patrols, aerial reconnaissance, and reconnaissance vehicles. The spectrum of reconnaissance vehicles currently ranges from older systems ill-suited for modern requirements, to survivable, mobile, and lethal systems, equipped with complex sensor arrays and communications suites.

A number of forces fielded *combat reconnaissance vehicles* (CRVs) designed for operations at or beyond the FLOT, not to initiate combat but to survive if engaged. They may operate in combat reconnaissance patrols with heavily armed vehicles such as tanks and IFVs. Many offer sensors no better than those on other armored vehicles, and use optics for a variety of combat support missions, such as fire support. Examples of these are the British Saladin Armored Car and the Austrian Pandur armored reconnaissance Fire Support Vehicle. Main guns on these vehicles can range up to 105 mm (South African Rooikat). A growing trend is for CRVs with added sensors (such as the Russian BRM-3K). It is a versatile vehicle configured for maneuver reconnaissance with thermal sights and a 30-mm gun, but is also useful for setting up a stationary surveillance position with its Tall Mike radar. As a command (-K type) vehicle, it employs a mix of radios to transmit intelligence across several nets in a combined arms force.

A recent trend is the fielding of vehicles with sophisticated multi-sensor arrays specially designed to operate behind or near the FLOT and provide continuous data to combined arms forces. An example is the Czech Snezka, which will be featured in an update. Vehicles designed to support specific branches are included with those branches (such as PRP-3/4 for artillery).

A class of vehicles widely proliferated for light patrol duties is the armored scout car. With wheels rather than tracks, light armor, and guns generally of 7.62 - 20 mm, they offer low cost but are vulnerable to a wide variety of weapons. Examples include the British Ferret and Russian BRDM-2. A recent category of vehicle which US Army forces will encounter is lightly armored vehicles on truck or jeep-type chassis with very light armor for security, and patrol. Some are unarmed; whereas others employ sophisticated weapons stations and lethal firepower (up to 30-mm guns). Smaller 4x4 scout vehicles (such as French VBL) and ultra-light fast-attack vehicles have also been built for light patrol and rapid reconnaissance missions.

This chapter provides a representative sampling of reconnaissance vehicles in use today. The selection is not comprehensive, rather reflects systems currently available to the OPFOR.

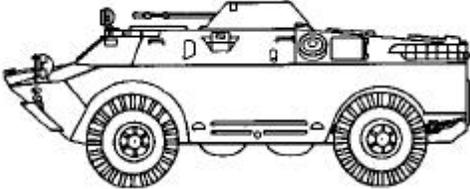
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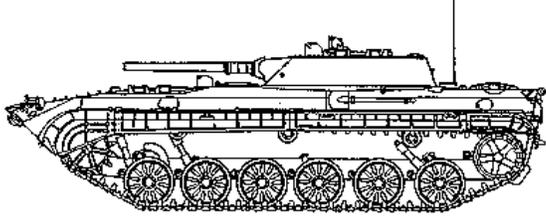
Russian Armored Scout Car BRDM-2

	<p>Weapons & Ammunition Types</p> <p>14.5-mm machinegun API, API-T, I-T HE-T</p> <p>7.62-mm coax MG Heavy ball, I-T, Light ball, Ball-T, API-T</p>	<p>Typical Combat Load</p> <p>500 160 340</p> <p>2,000</p>
<p>SYSTEM Alternative Designations: GAZ 41-08 Date of Introduction: 1963 Proliferation: At least 45 countries Description: Crew: 4 Troop Capacity: 0 (for this configuration) Combat Weight (mt): 7.0 Chassis Length Overall (m): 5.75 Height Overall (m): 2.31 Width Overall (m): 2.75 Ground Pressure (kg/cm²): INA Drive Formula: 4 x 4 (+ 4 auxiliary wheels)</p> <p>Automotive Performance: Engine Type: 140-hp Gasoline Cruising Range (km): 750 Speed (km/h): Max Road: 95 Max Off-Road: INA Average Cross-Country: INA Max Swim: 10 Fording Depths (m): Amphibious</p> <p>Radio: R-123</p> <p>Protection: Armor, Turret Front (mm): 10 Applique Armor (mm): N/A Explosive Reactive Armor (mm): N/A Mineclearing Equipment: N/A Self-Entrenching Blade: N/A Active Protective System: N/A NBC Protection System: Collective Smoke Equipment: N/A</p> <p>ARMAMENT Main Armament: Caliber, Type, Name: 14.5-mm Machinegun KPVT Rate of Fire (rd/min): 150 practical/600 cyclic Loader Type: Belt feed Ready/Stowed Rounds: 500/0 Elevation (°): -5 / +30 Fire on Move: Yes</p> <p>Auxiliary Weapon: Caliber, Type, Name: 7.62-mm (7.62x 54R) Machinegun PKT Mount Type: Coax Maximum Aimed Range (m): 1,500 Max Effective Range (m): Day: 1,000m / 400-500 on the move Night: N/A</p>	<p>Fire on Move: Yes Rate of Fire (rd/min): 250 practical / 650 cyclic in 2-10 round bursts</p> <p>ATGM Launcher: N/A Firing Ports: INA</p> <p>FIRE CONTROL FCS Name: N/A Main Gun Stabilization: N/A Rangefinder: N/A Infrared Searchlight: INA Sights w/Magnification: Gunner: Day: PP-61AM Field of View (°): 23 Acquisition Range (m): 2,000 Night: N/A Field of View (°): INA Acquisition Range (m): INA Commander Fire Main Gun: No</p> <p>VARIANTS Polish modernized variant has been offered in five versions, with upgrades such as: 12.7-mm MG, improved PKT MG mount, roof-mounted AT-4 ATGM, surveillance radar, improved fire control, etc.</p> <p>Antitank guided missile launcher vehicles: 9P122 variant with 6-rail AT-3 ATGM launcher 9P124 variant with 4-rail AT-2 MCLOS ATGM launcher 9P133 variant with 6-rail AT-3C SACLOS ATGM launcher 9P137 variant with 5-rail AT-5 ATGM launcher 9P148 variant with 5-rail AT-4 or AT-5 ATGM launcher.</p> <p>BRDM-2Rkh: NBC reconnaissance vehicle BRDM-2U: Command variant without a turret SA-9: SAM system transporter-erector-launcher vehicle</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 14.5-mm API-T Maximum Aimed Range (m): INA Max Effective Range (m): Day: 2,000 Night: INA Tactical AA Range: 1,400 Armor Penetration (mm): 20 at 1,000 m/30 at 500 m</p> <p>Other Ammunition Types: 14.5-mm API, I-T, HE-T Type MDZ</p>	

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Some BRDMs may include an AT-4 launcher and ATGMs for dismounted self-defense.

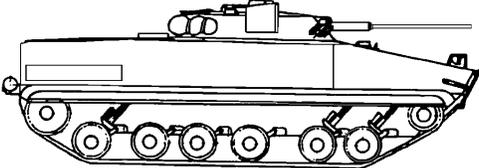
Russian Armored Reconnaissance Command Vehicle BRM-1K

	<p>Weapons & Ammunition Types</p> <p>73-mm gun HEAT HE</p> <p>7.62-mm coax MG</p>	<p>Typical Combat Load</p> <p>20 (est) 10 10</p> <p>2,000</p>
<p>SYSTEM Alternative Designations: BMP M1976/2 Date of Introduction: 1976 Proliferation: At least 3 countries Description: Crew: 4 (with addition of a navigator) Troop Capacity: 6 passengers Combat Weight (mt): 13.3 Chassis Length Overall (m): 6.74 Height Overall (m): 2.15 Width Overall (m): 2.94 Ground Pressure (kg/cm²): 0.57</p> <p>Automotive Performance: Engine Type: 300-hp diesel Cruising Range (km): 600 Speed (km/h): Max Road: 65 Max Off-Road: 40-45 Average Cross-Country: INA Max Swim: 7 Forcing Depth (m): Amphibious Radio: R-173, R-130, 2x R-148 manportable, R-014D telegraph</p> <p>Protection: Armor, Turret Front (mm): 19-23 Applique Armor (mm): Available Explosive Reactive Armor (mm): Available Active Protective System: N/A Mineclearing Equipment: N/A Self-Entrenching Blade: N/A NBC Protection System: Yes Smoke Equipment: VEES</p> <p>ARMAMENT Main Armament: Caliber, Type, Name: 73-mm smoothbore gun, 2A28/Grom Rate of Fire (rd/min): 7-8 Loader Type: Autoloader Ready/Stowed Rounds: 20 / 0 Elevation (°): -4/+33 Fire on Move: Yes, but only 10 km/h or less (est)</p> <p>Auxiliary Weapon: Caliber, Type, Name: 7.62-mm (7.62x 54R) machinegun PKT Mount Type: Coaxial Maximum Aimed Range (m): 1,300 Max Effective Range (m): Day: 1,000 / 400-500 on the move</p>	<p>Night: 800 Fire on Move: Yes Rate of Fire (rd/min): 250 practical / 650 cyclic, in 2-10 round bursts Firing Ports: 1 on each side, 1 in left rear door</p> <p>FIRE CONTROL FCS Name: INA Main Gun Stabilization: No Rangefinder: Laser Infrared Searchlight: Yes Sights w/Magnification: Gunner: Day: 1PN22M2, 8x Field of View (°): 15 (est) Acquisition Range (m): INA Night: 1PN22M2 II channel, 6x Field of View (°): 6 (est) Acquisition Range (m): 800-1,000, based on light</p> <p>VARIANTS BRM-1: Baseline armored reconnaissance vehicle (BMP M1976/1) without smoke grenade launchers, added comms (R-130, R-014D telegraph), and Tall Mike radar but with four more passengers.</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 73-mm HEAT-FS, PG-9 Maximum Aimed Range (m): 1,300 Max Effective Range (m): Day: 800, 600 on the move Night: 800 Armor Penetration (mm): 335 (RHA)</p> <p>73-mm HEAT-FS, NFI Maximum Aimed Range (m): 1,300 Max Effective Range (m): Day: 1,000, 600 on the move Night: 800-1,000 Armor Penetration (mm): >400 (RHA)</p> <p>73-mm HE, OG-9 Maximum Aimed Range (m): 1,300 Max Effective Range (m): Day: 1,300, 1,000 on the move Night: 1,000 Armor penetration (mm): INA</p> <p>Other Ammunition Types: 73-mm HE, OG-9M</p>	

NOTES

Derived from BMP-1, the vehicle has a 2-man turret and additional sensors. Two manportable SAM launchers are included. BMP-1 options fit BRM-1 and -1K. SENSORS: 1PN22M2 sight, 1D8 laser rangefinder, and Tall-Mike battlefield surveillance radar. Radar characteristics: operating band I (9.0 GHz); detection ranges 30 km personnel, 12 km vehicles. The Russian Alis or Sanoet thermal gunner's sight can be installed. Passengers may dismount from BRM-1K and will dismount from BRM-1 to form an alternate reconnaissance post.

Russian Combat Reconnaissance Vehicle BRM-3K

	<p>Weapons & Ammunition Types</p> <p>30-mm auto gun HE-I & Frag-HE-T APDS, APFSDS-T</p> <p>7.62-mm coax MG</p>	<p>Typical Combat Load</p> <p>500 340 160</p> <p>2,000</p>
<p>SYSTEM Alternative Designations: Lynx, Rys Date of Introduction: 1990 Proliferation: At least 1 country Description: Crew: 6 Combat Weight (mt): 19.6 Chassis Length Overall (m): 6.10 Height Overall (m): 2.65 Width Overall (m): 3.15 Ground Pressure (kg/cm²): 0.62</p> <p>Automotive Performance: Engine Type: 500-hp Diesel Cruising Range (km): 600 Speed (km/h): Max Road: 70 Max Off-Road: 45 Average Cross-Country: 35 Max Swim: 10 Fording Depths (m): Amphibious</p> <p>Radio: R-163-50U UHF, R-163-50K HF, R-163-10U (dismounts)</p> <p>Protection: Armor, Turret Front (mm): 30-35 mm (front glacis) Applique Armor (mm): Yes on turret Explosive Reactive Armor (mm): Available Mineclearing Equipment: N/A Self-Entrenching Blade: N/A Active Protective System: N/A NBC Protection System: Collective Smoke Equipment: 6 Smoke grenade launchers, VEES</p> <p>ARMAMENT Main Armament: Caliber, Type, Name: 30-mm automatic gun, 2A72 Rate of Fire: 350 rd/min (cyclic) in bursts Loader Type: Dual-belt feed Ready/Stowed Rounds: 500/ 0 Elevation (°): -5 to + 60 Fire on Move: Yes</p> <p>Auxiliary Weapon: Caliber, Type, Name: 7.62-mm machinegun, PKT Mount Type: Turret coax Max Effective Range: Day: 2,000 m Night: 1,200-1,500 passive/2,000 active Fire on Move: Yes</p>	<p>Rate of Fire (rd/min): 250 practical / 650 cyclic, in 2-10 round bursts</p> <p>Firing Ports: 1 on each side</p> <p>FIRE CONTROL FCS Name: BPK-2-42 Main Gun Stabilization: 2-plane, 2E52-1 Rangefinder: Laser Infrared Searchlight: Yes Sights w/Magnification: Gunner: Day: BPK-2-42 Field of View (°): 8 Acquisition Range (m): 4,000 (est) Night: 1PN61 II/IR sight Field of View (°): INA Acquisition Range (m): 1,200-1,500/3,000+ active IR</p> <p>Commander Fire Main Gun: INA</p> <p>VARIANTS N/A</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 30-mm APDS Maximum Aimed Range (m): 4,000 (est) Max Effective Range (m): Day: 2,500 Night: 1,200-1,500 passive/ 2,500 active Tactical AA Range: 4,000 Armor Penetration (mm): 25 (RHA) at 1,500 m</p> <p>30-mm APFSDS-T M929 Maximum Aimed Range (m): 4,000 (est) Max Effective Range (m): Day: 2,500+ Night: 1,200-1,500 passive/2,500+ active Tactical AA Range: 4,000 Armor penetration (mm): 55 (RHA) at 1,000 m, 45 at 2,000 m</p> <p>30-mm Frag-HE Maximum Aimed Range (m): 4,000 Max Effective Range (m): Day: 4,000 Night: 1,200-1,500 passive/ 3,000+ active Tactical AA Range: 4,000 Armor Penetration (mm): INA</p> <p>Other Ammunition Types: 30-mm HEI-T, AP-T</p>	

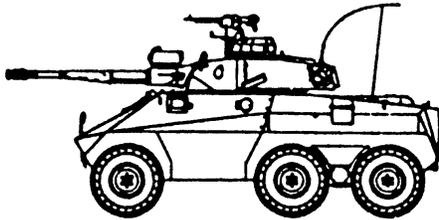
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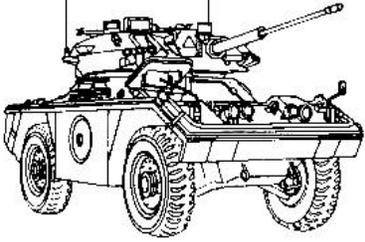
BRM-3K is a variant of BMP-3 with a steel hull.

ONBOARD SENSORS: The 1PN71 thermal sight (3.7x/11.5x) has an acquisition range against tanks of 3.0 km. The 1D14 laser rangefinder (73x and 18x sights) has a day light only acquisition range of 10.0 km. The 1PN61 passive image intensifier night sight uses a laser illuminator. In the passive mode, the Generation II (7x) sight has a night acquisition range of 1.2-1.5 km. Using the active laser pulse illuminator, the acquisition range can be extended. Tall Mike Radar has an operating band I (9.0 GHz), and detection ranges: 3.0 km against personnel, 12.0 against moving vehicles.

Brazilian Armored Reconnaissance Vehicle EE-9

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	<p>Weapons & Ammunition Types</p> <p>90-mm cannon APFSDS-T HEAT-T, HESH HE-T</p> <p>7.62-mm coax MG .50 cal AA MG</p>	<p>Typical Combat Load</p> <p>44 (est) 11 11 22</p> <p>2,000 500</p>
<p>SYSTEM Alternative Designations: Cascavel IV Date of Introduction: 1977 Proliferation: At least 18 countries (all variants) Description: Crew: 3 Troop Capacity: None Combat Weight (mt): 13.4 Chassis Length Overall (m): 5.19 Height Overall (m): 2.36 Width Overall (m): 2.66 Drive Formula: 6 x 6</p> <p>Automotive Performance: Engine Type: 212-hp Diesel Cruising Range (km): 880 Speed (km/h): Max Road: 100 Max Off-Road: INA Average Cross-Country: INA Max Swim: N/A Fording Depth (m): 1.0 unprepared</p> <p>Radio: INA</p> <p>Protection: Armor, Turret Front (mm): 16 Applique Armor (mm): N/A Explosive Reactive Armor (mm): N/A Active Protective System: N/A Mineclearing Equipment: N/A Self-Entrenching Blade: N/A NBC Protection System: N/A Smoke Equipment: 6 smoke grenade launchers</p> <p>ARMAMENT Main Armament: Caliber, Type, Name: 90-mm gun, Engesa EC-90 (Cockerill-type) Rate of Fire (rd/min): INA Loader Type: Manual Ready/Stowed Rounds: 24/ 20 Elevation (°): -8/+15 Fire on Move: INA</p> <p>Auxiliary Weapons: Caliber, Type, Name: 7.62-mm MG, INA Mount Type: Coax Maximum Aimed Range (m): 2,000 Max Effective Range (m): Day: INA Night: INA Fire on Move: Yes Rate of Fire (rd/min): INA</p>	<p>Caliber, Type, Name: .50 Cal M2 HB MG Mount Type: Cupola Maximum Aimed Range (m): 2,000 Max Effective Range (m): Day: 2,000 Night: INA Fire on Move: Yes Rate of Fire (rd/min): INA</p> <p>ATGM Launcher: N/A Firing Ports: N/A</p> <p>FIRE CONTROL FCS Name: INA Main Gun Stabilization: N/A Rangefinder: LV3 laser rangefinder Infrared Searchlight: N/A Sights w/Magnification: Gunner: Day: SS-123, 10x Field of View (°): INA Acquisition Range (m): INA Night: SS-122 II channel, 5.6x Field of View (°): INA Acquisition Range (m): INA Commander Fire Main Gun: No</p> <p>VARIANTS Cascavel I: Original vehicle had a US M36 37-mm gun turret. Cascavel II: Variant with a French 90-mm gun from AML-90. Cascavel III: Uses the 90-mmCockerill gun and new transmission. Cascavel IV: Has a new engine and transmission, improved day and night optics with laser rangefinder, and .a 50 cal antiaircraft MG.</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 90-mm APFSDS-T, Engequimica-produced Maximum Aimed Range (m): INA Max Effective Range (m): Day: 2,000+ Night: INA Armor Penetration (mm): INA</p> <p>90-mm HE-T, Engequimica-produced Maximum Aimed Range (m): INA Max Effective Range (m): Day: 2,200 Night: INA Armor Penetration (mm): INA</p> <p>Other Ammunition Types: HEAT-T, HESH-T, Smoke, Cannister</p>	
<p>NOTES Other ammunition maximum effective ranges are (m): HEAT-T - 1,500, HESH-T - 800.</p>		
<p>British Armored Reconnaissance Vehicle Fox</p>		
	<p>Weapons & Ammunition</p>	<p>Typical</p>

	<table border="1"> <thead> <tr> <th>Types</th> <th>Combat Load</th> </tr> </thead> <tbody> <tr> <td>30-mm auto-cannon HEI-T, APDS-T, APSE-T</td> <td>99 (est) 66 33</td> </tr> <tr> <td>7.62-mm coax MG</td> <td>2,600</td> </tr> </tbody> </table>	Types	Combat Load	30-mm auto-cannon HEI-T, APDS-T, APSE-T	99 (est) 66 33	7.62-mm coax MG	2,600
Types	Combat Load						
30-mm auto-cannon HEI-T, APDS-T, APSE-T	99 (est) 66 33						
7.62-mm coax MG	2,600						
<p>SYSTEM Alternative Designations: FV721 Date of Introduction: 1973 Proliferation: At least 3 countries</p> <p>Description: Crew: 3 Troop Capacity: 0 Combat Weight (mt): 6.12 Chassis Length Overall (m): 4.17 Height Overall (m): 2.20 Width Overall (m): 2.13 Ground Pressure (kg/cm²): INA Drive Formula: 4 x 4</p> <p>Automotive Performance: Engine Type: 190-hp Gasoline Cruising Range (km): 434 Speed (km/h): Max Road: 104 Max Off-Road: INA Average Cross-Country: INA Max Swim: 5.23 Fording Depth (m): 1.0 Unprepared</p> <p>Radio: INA</p> <p>Protection: Armor, Turret Front (mm): Resistant to heavy MG (NFI) Applique Armor (mm): N/A Explosive Reactive Armor (mm): N/A Active Protective System: N/A Mineclearing Equipment: N/A Self-Entrenching Blade: N/A NBC Protection System: N/A Smoke Equipment: 2 x 4-barrel smoke grenade launchers</p> <p>ARMAMENT Main Armament: Caliber, Type, Name: 30-mm auto-cannon, Rarden L21 Rate of Fire (rd/min): 80-90 cyclic (1-6 round bursts) Loader Type: Feed tray, manual clip-fed (3-round clips) Ready/Stowed Rounds: INA Elevation (°): -14/+40 Fire on Move: INA</p> <p>Auxiliary Weapon: Caliber, Type, Name: 7.62-mm machinegun L7A2</p>	<p>Mount Type: Coax Maximum Aimed Range (m): INA Max Effective Range (m): INA Fire on Move: Yes Rate of Fire (rd/min): INA</p> <p>ATGM Launcher: N/A Firing Ports: None</p> <p>FIRE CONTROL FCS Name: INA Main Gun Stabilization: N/A Rangefinder: N/A Infrared Searchlight: N/A Sights w/Magnification: Gunner: Day: SPAV L2A1, 5.8/1.6 x Field of View (°): 8/28 Acquisition Range (m): INA Night: L2A1, II sight Field of View (°): INA Acquisition Range (m): INA</p> <p>Commander Fire Main Gun: No</p> <p>VARIANTS None of the variants have been fielded.</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 30-mm APDS-T, L14A2 Maximum Aimed Range (m): 1,500 Max Effective Range (m): Day: 1,000 Night: INA Tactical AA Range: INA Armor Penetration (mm): 40 (RHA, 45°) at 1,500 meters</p> <p>Caliber, Type, Name: 30-mm HE-T, L13A1 Maximum Aimed Range (m): 2,000 Max Effective Range (m): INA Tactical AA Range: INA Armor Penetration (mm): N/A</p> <p>Other Ammunition Types: APSE-T (AP Secondary Effects-T L5A2). The gun can fire the KCB (Oerlikon) family of munitions.</p>						

NOTES

These vehicles have been phased out of British service.

Chapter 4 Tanks/Assault Vehicles

The lethality and variety of weapons available to armored, mechanized, and infantry forces for the close fight require a continued and expanded use of heavily armored fighting vehicles (AFVs). This chapter provides a representative sampling of AFVs in use today and designed for combat assault. The selection is not comprehensive, rather reflects a mix of systems currently available for the OPFOR and likely to be encountered in varying levels of conflict. The selection is also used to highlight trends within this field of weapons.

Vehicles used for combat assault in this Guide are divided into two categories—*main battle tanks and light tanks/assault vehicles*. Tanks are tracked, heavily armored vehicles with guns of generally 75 mm or more. Among modern trends in AFVs are: increased variety of systems worldwide, and a wider application of these systems for varied roles and missions on the battlefield. As a result, technology sharing and proliferation of upgrade packages have blurred lines among vehicles used for assault, antiarmor, combat reconnaissance and fire support missions. Another trend is increased weight for all types of armored vehicles. With heavier armor protection packages, higher-output engines and larger weapons, a significant proportion of medium tanks have grown into the heavy tank weight category. Therefore, the term *main battle tank* is more relevant than previous weight categories.

There are still *light tanks* on the battlefield, although increased armor and gun size on light armored fighting vehicles such as infantry fighting vehicles and armored reconnaissance vehicles have blurred lines of distinction. A number of AFVs, such as the British Scorpion and French AMX-13 can be characterized as reconnaissance vehicles, tank destroyers, fire support vehicles, or assault vehicles; but they have tracks, armor protection, and guns of 60 mm or greater. Thus, they can also be used for light tank missions. The term *assault vehicle* currently represents a narrow category of older vehicles used by (former) Soviet forces - medium-armored vehicles with medium-heavy guns and no turrets. None of these vehicles were selected for this initial publication. Some representative systems will be included in the next iteration. With blurring of lines among roles and missions for heavier LAFVs and light tanks, the term *assault vehicle* will likely broaden to reflect a variety of modern programs for light - medium armored vehicles with medium to heavy guns, for use in the assault role.

Two notable trends for vehicles in this chapter are a reflection of increasing systems costs and declines or leveling of military budgets - development of variants off of established systems, and use of equipment/packages to extend the use life of systems and enhance their effectiveness. As a result, seemingly old and out-of-date tanks, some of which pre-date World War II, can be a threat to modern armored and mechanized forces. The WEG highlights a variety of upgrades as well as limitations for selected tanks. Systems-related trends can be divided among mobility, survivability, and lethality, as noted on the data sheets.

To improve mobility and compensate for weight increases, many forces have replaced older engines with more powerful diesel engines. Swim capability is limited to a few light tanks.

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Within the area of survivability, the most obvious consideration is increasing armor protection levels. A prominent trend is the application of additional armor, such as plate armor or panels on turrets, side-skirts over tracks, and addition of explosive reactive armor (ERA). Additional protection measures include use of entrenching blades for self-emplacement, mine-clearing plows and rollers, nuclear, biological and chemical (NBC) protection, vehicle smoke emission systems, and smoke grenade launchers. To complement these systems are sensors such as mine detectors, laser warning receivers, and radar warning receivers. A trend receiving increasing attention is the use of active measures: electro-optical countermeasures, such as infrared jammers, and active protection systems (also known as defensive aides suites) designed to intercept incoming projectiles and destroy them prior to impact.

The area of lethality has seen a variety of upgrades, including: gun replacement, improved stabilization and fire control systems, additional weapons such as antitank guided missile systems, and improved ammunition. Critical parameters include fire on the move capability, which can be linked to stabilization, rate of fire, integrated sights, acquisition ranges, and weapon range. Note, because weapon range is really a function of sights, gun precision, the type of mount, and specific round ballistics, the WEG will incorporate those factors in the round data, as maximum aimed range. That figure conforms to the OPFOR tactics and accounts for technical capabilities (see Glossary). Maximum effective range is also included (see Glossary).

The WEG notes a variety of new ammunition natures, such as electronically fuzed tank rounds for use against helicopters, and OPFOR availability of western-style HEAT-multipurpose rounds, which can be used as both antitank and antipersonnel rounds, for greater flexibility and lethality. For some systems, the ammunition mix could be determined or estimated. For others, that data was not available. Within each category, the specific round mix will depend on tactical considerations, comparative lethality and the intended targets. A general rule for OPFOR is that tanks will have approximately 50% antitank rounds and 50% rounds for use against soft targets. Because of the relative increase in protection against HEAT rounds vs kinetic energy rounds, mix estimates reflect a bias toward KE rounds. The term *stowed rounds* does not mean rounds which are not in the tank's autoloader. Rounds in ready reach are ready rounds. Stowed rounds are those which are in compartments away from the gunner's or loader's positions, requiring a slower than normal rate of fire (see Glossary). In calculating tank rounds, the figure does not include the tactical possibility of adding an additional round in the breach.

Secondary arms continue to play an important role for OPFOR tanks, because their use permits the main gun to focus fires more on heavy and area targets. Tankers will fire main guns at hovering or slow-flying aircraft; however, the more likely weapon is the antiaircraft machinegun. Similarly, OPFOR tanks will fire main guns at personnel and other soft targets as required; but the more efficient weapon for targets at close range is the coaxial machinegun.

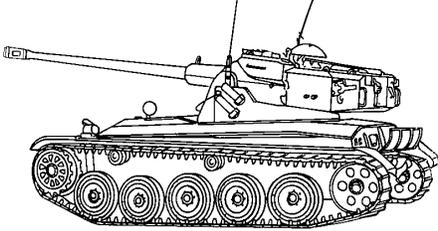
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French Light Tank AMX-13

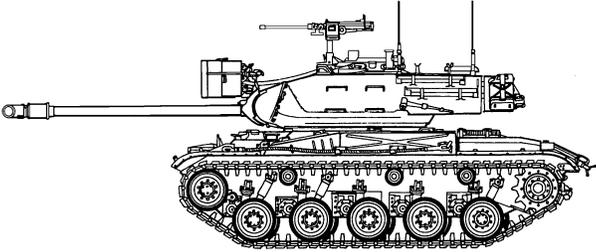
 <p style="text-align: center;">AMX-13 Model 51/75 mm Gun</p>	<p>Weapons & Ammunition Types</p> <p>90-mm rifled gun APFSDS-T HEAT HE Cannister</p> <p>7.62-mm coax MG</p>	<p>Typical Combat Load</p> <p style="text-align: center;">34</p> <p style="text-align: center;">3,600</p>
<p>SYSTEM Alternative Designations: AMX-13/90 Date of Introduction: 1966 Proliferation: At least 15 countries Description: Crew: 3 Combat Weight (mt): 15.0 Chassis Length Overall (m): 4.88 Height Overall (m): 2.28 Width Overall (m): 2.51 Ground Pressure (kg/cm²): 0.74</p> <p>Automotive Performance: Engine Type: 250-hp Gasoline Cruising Range (km): 350 Speed (km/h): Max Road: 60 Max Off-Road: INA Average Cross-Country: INA Max Swim: N/A Fording Depths (m): 0.6 unprepared, 2.1 with snorkel</p> <p>Radio: TR-VP118 and intercom</p> <p>Protection: Armor, Turret Front (mm): 25 at 45° impact angle Applique Armor (mm): N/A Explosive Reactive Armor (mm): N/A Active Protective System: N/A Mineclearing Equipment: N/A Self-Entrenching Blade: N/A NBC Protection System: N/A Smoke Equipment: 2 smoke grenade launchers each side of turret</p> <p>ARMAMENT Main Armaments: Caliber, Type, Name: 90-mm rifled gun CN-90-F3 Rate of Fire (rd/min): INA Loader Type: Autoloader and manual Ready/Stowed Rounds: 10 in autoloader, 11/13 in hull Elevation (°): -5.5/+12.5 Fire on Move: N/A</p> <p>Auxiliary Weapon: Caliber, Type, Name: 7.62-mm (7.62x51) MG, AA52 Mount Type: Turret coax Maximum Aimed Range (m): INA Max Effective Range (m): Day: INA</p>	<p>Night: INA Fire on Move: Yes Rate of Fire (rd/min): INA</p> <p>FIRE CONTROL FCS Name: INA Main Gun Stabilization: N/A Rangefinder: N/A Infrared Searchlight: Yes Sights w/Magnification: Gunner: Day: L862, 7.5x and 8x Field of View (°): INA Acquisition Range (m): INA Night: OB-11-A, 5x Field of View (°): INA Acquisition Range (m): 800-1,000 Commander Fire Main Gun: No</p> <p>VARIANTS AMX-13 Model 51: Original tank destroyer/recon vehicle, Model 51, w/75-mm gun. Many variants and upgrades have diesel engines and a 7.62-mm AA MG. Two versions were fitted with 2 x SS-11 or 3 x HOT ATGM launchers AMX-13/90: This is the variant portrayed on this data sheet. AMX-13/105: Variant with a GIAT 105G1 105-mm gun. AMX-13 CD Model 55: Armored recovery variant. AMX-13 DCA: Air defense variant with twin 30-mm guns. AMX-13 with LAR: Multiple Rocket Launcher System. AMX 105-mm Mk 61: Self-propelled howitzer variant. AMX F3: 155-mm self-propelled gun. AMX-VCI: Variant used as an APC.</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 90-mm APFSDS-T, NFI Maximum Aimed Range (m): INA Max Effective Range (m): Day: 2,000 Night: 800-1,000 Armor Penetration (mm): INA</p> <p>90-mm HEAT, NFI Maximum Aimed Range (m): INA Max Effective Range (m): Day: 1,000 Night: N/A Armor Penetration (mm): 160 (RHA) at 60° impact angle</p> <p>Other Ammunition Types: HE, Cannister, Smoke</p>	

NOTES

Israeli EL-OP thermal sights are available for use on the tank.

US Light Tank M41A3

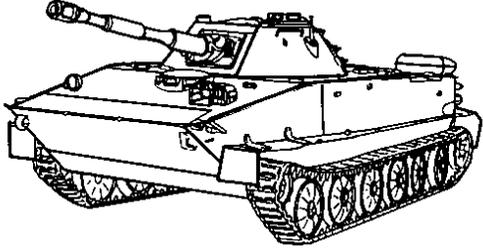
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	<p>Weapons & Ammunition Types</p> <p>76-mm rifled gun M32 APDS-T/APFSDS-T HEAT -T Frag-HE Cannister</p> <p>7.62-mm coax MG 12.7-mm AA MG</p>	<p>Typical Combat Load</p> <p>65 20 20 20 5</p> <p>5,000 2,175</p>
<p>SYSTEM Alternative Designations: Walker Tank, Walker Bulldog Date of Introduction: 1951 Proliferation: At least 18 countries Description: Crew: 4 Combat Weight (mt): 23.5 Chassis Length Overall (m): 5.82 Height Overall (m): 2.73 Width Overall (m): 3.20 Ground Pressure (kg/cm²): 0.72</p> <p>Automotive Performance: Engine Type: 500-hp Gasoline Cruising Range (km): 161 Speed (km/h): Max Road: 72 Max Off-Road: 48 Average Cross-Country: 40 Max Swim: N/A Fording Depths (m): 1.0 Unprepared, 2.4 prepared</p> <p>Radio: INA</p> <p>Protection: Armor, Turret Front (mm): 38 Applique Armor (mm): Available Explosive Reactive Armor (mm): N/A Active Protective System: N/A Mineclearing Equipment: N/A Self-Entrenching Blade: N/A NBC Protection System: N/A Smoke Equipment: N/A</p> <p>ARMAMENT Main Armament: Caliber, Type, Name: 76-mm rifled gun M32 Rate of Fire (rd/min): INA Loader Type: Manual Ready/Stowed Rounds: INA Elevation (°): -9.75/+19.75 Fire on Move: No</p> <p>Auxiliary Weapon: Caliber, Type, Name: 7.62-mm (7.62x51) MG, M9194E1 Mount Type: Turret coax Maximum Aimed Range (m):</p>	<p>Max Effective Range (m): Day: INA Night: N/A Fire on Move: Yes Rate of Fire: INA</p> <p>Caliber, Type, Name: .50 (12.7 x 99) AA machinegun, M2HB Mount Type: Cupola AA mount Maximum Aimed Range (m): INA Max Effective Range (m): Day: 2,000 Night: INA Fire on Move: Yes Rate of Fire (rd/min): 450-550</p> <p>FIRE CONTROL FCS Name: INA Main Gun Stabilization: N/A Rangefinder: N/A Infrared Searchlight: Available Sights w/Magnification: Gunner: Day: M97A1 and M20A1 Field of View (°): INA Acquisition Range (m): INA Night: Available Commander Fire Main Gun: No</p> <p>VARIANTS M41 DK-1: Danish variant with diesel engine and LRF-based fire control. Other upgrades are side skirts, thermal sights, NBC protection, smoke grenade launchers and 7.62-mm AA MG. Brazilian M41: Upgrades are similar to DK-1 except for AA MG and change to 90-mm gun using Cockerill Mk III ammunition. Uruguayan M41: M41A3 fitted with Cockerill Mk III gun. YUNG HU: Taiwanese upgrade with diesel engine. M42/Duster: Air defense gun system with twin 40-mm AA cannon.</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 76-mm APFSDS-T, AAI M464 Maximum Aimed Range (m): INA Max Effective Range (m): INA Armor Penetration (mm): NATO triple heavy (57°) at 1000 m</p> <p>Other Ammunition Types: M33A1 and A2 APDS-T, M319 and M339 AP-T, M496 HEAT-T, HE, Smoke (WP), M363 cannister</p>	

NOTES

German Atlas offers the MOLF 1-plane stabilized laser rangefinder fire control system and retrofit kit. The FCS includes a thermal night sight. Israeli EL-OP offers a FCS for the system. Maximum range for the canister round is 155 meters.

Russian Amphibious Tank PT-76B

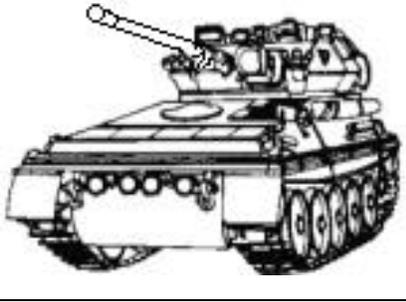
	<p>Weapons & Ammunition Types</p> <p>76-mm rifled gun D-56 HVAP, AP-T/API-T HEAT Frag-HE</p> <p>7.62-mm coax MG</p>	<p>Typical Combat Load</p> <p>40 10 10 20</p> <p>1,000</p>
<p>SYSTEM Alternative Designations: INA Date of Introduction: 1952 Proliferation: At least 21 countries Description: Crew: 3 Combat Weight (mt): 14.0 Chassis Length Overall (m): 6.91 Height Overall (m): 2.26 Width Overall (m): 3.14 Ground Pressure (kg/cm²): 0.46</p> <p>Automotive Performance: Engine Type: 240-hp Diesel Cruising Range (km): 260 Speed (km/h): Max Road: 44 Max Off-Road: INA Average Cross-Country: 25 Max Swim: 10 Forcing Depth (m): Amphibious</p> <p>Radio: R-123 Protection: Armor, Turret Front (mm): 20 Applique Armor (mm): N/A Explosive Reactive Armor (mm): N/A Active Protective System: N/A Mineclearing Equipment: N/A Self-Entrenching Blade: N/A NBC Protection System: N/A Smoke Equipment: VEES</p> <p>ARMAMENT Main Armament: Caliber, Type, Name: 76-mm rifled gun D-56B Rate of Fire (rd/min): 6-8 Loader Type: Manual Ready/Stowed Rounds: INA Elevation (°): -4/+30 Fire on Move: Yes</p> <p>Auxiliary Weapon: Caliber, Type, Name: 7.62-mm (7.62x54R) machinegun PKT Mount Type: Coax Maximum Aimed Range (m): 1,500 Max Effective Range (m): Day: 1,000/400-500 on the move Night: 600</p>	<p>Fire on Move: Yes Rate of Fire (rd/min): 250 practical / 650 cyclic, 2-10 round bursts</p> <p>FIRE CONTROL FCS Name: INA Main Gun Stabilization: 2-plane Rangefinder: N/A Infrared Searchlight: Available Sights w/Magnification: Gunner: TShK-66 Day: Field of View (°): INA Acquisition Range (m): 4,000 Night: TVN-28 IR Available Field of View (°): INA Acquisition Range (m): 600 Commander Fire Main Gun: No</p> <p>VARIANTS Polish PT-76: Variant with a separate commander's hatch and 12.7-mm MG. Type 63: Chinese variant with a new turret, 85-mm gun, and 12.7-mm AA MG.</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 76-mm HVAP-T, BM-354P Maximum Aimed Range (m): 1,060 Max Effective Range (m): Day: 650 Night: 600 Armor Penetration (mm): 127 at muzzle, 50 at 1,000 m</p> <p>76-mm HEAT, BK-350M Maximum Aimed Range (m): 1,000 Max Effective Range (m): Day: 650 Night: 600 Armor Penetration (mm): 280 to max range</p> <p>76-mm, Frag-HE, OF-350 Maximum Aimed Range (m): 4,000 Max Effective Range (m): Day: INA Night: 600 Armor Penetration (mm): INA</p> <p>Other Ammunition Types: 76-mm AP-T, BR-350 API-T</p>	

NOTES

Original PT-76 was produced in limited numbers with a non-stabilized main gun. Some PT-76s are augmented with 12.7-mm AA MGs. Israel offers an upgrade package with a 90-mm gun, LRF fire control and a 300-hp engine.

British Combat Reconnaissance Vehicle, Tracked Scorpion _____

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	<p>Weapons & Ammunition Types</p> <p>76-mm rifled gun HESH HE Cannister</p> <p>7.62-mm coax MG</p>	<p>Typical Combat Load</p> <p>40</p> <p>3,600</p>
	<p>SYSTEM Alternative Designations: FV101 Date of Introduction: 1972 Proliferation: At least 18 countries Description: Crew: 3 Combat Weight (mt): 8.07 Chassis Length Overall (m): 4.79 Height Overall (m): 2.10 Width Overall (m): 2.24 Ground Pressure (kg/cm²): 0.36</p> <p>Automotive Performance: Engine Type: 190-hp Gasoline Cruising Range (km): 650 Speed (km/h): Max Road: 80 Max Off-Road: INA Average Cross-Country: INA Max Swim: 4/6 with propeller Fording Depth (m): 1.07, amphibious</p> <p>Radio: INA</p> <p>Protection: Armor, Turret Front (mm): Against 14.5-mm projectiles Applique Armor (mm): N/A Explosive Reactive Armor (mm): N/A Active Protective System: N/A Mineclearing Equipment: N/A Self-Entrenching Blade: N/A NBC Protection System: Yes Smoke Equipment: 4 smoke grenade launchers each side of turret</p> <p>ARMAMENT Main Armament: Caliber, Type, Name: 76-mm rifled gun L23A1 Rate of Fire (rd/min): 6 Loader Type: INA Ready/Stowed Rounds: INA Elevation (°): -10/ +35 Fire on Move: N/A</p> <p>Auxiliary Weapon: Caliber, Type, Name: 7.62-mm (7.62x51) MG, L8A1 Mount Type: Turret coax Maximum Aimed Range (m): INA Max Effective Range (m): INA Fire on Move: Yes Rate of Fire (rd/min): INA</p> <p>FIRE CONTROL FCS Name: INA Main Gun Stabilization: N/A Rangefinder: Laser rangefinder Infrared Searchlight: Yes Sights w/Magnification: Gunner: Day: Barr and Stroud Tank Laser Sight, 10x Field of View (°): INA Acquisition Range (m): 2,200 Night: GEC Sensors SS100, II, x5.8/1.6 Field of View (°): 8/28 Acquisition Range (m): INA Commander Fire Main Gun: No</p> <p>VARIANTS Scorpion 90: Variant with a 90-mm Cockerill Mk III gun.</p> <p>A number of vehicles use the same Alvis chassis. They include the Scimitar armored reconnaissance vehicle, Striker armored ATGM launcher vehicle, Spartan armored personnel carrier or Milan ATGM launcher, Stormer modernized APC, Samaritan armored ambulance, and Saber modernized reconnaissance vehicle.</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 76-mm HESH, L29 Maximum Aimed Range (m): 2,200 Max Effective Range (m): INA Armor Penetration (mm): INA</p> <p>Other Ammunition Types: L24A1/2 HE (max effective range--indirect fire: 5,000 meters), L33A1 Cannister (max effective range: 100 meters), L32A5 Smoke (BE), L42 Illumination</p>	

NOTES

As a reflection of the vehicle's suitability for a variety of roles, in recent times it is referred to as an armored reconnaissance vehicle or combat vehicle reconnaissance (tracked)--CVR (T).

A British upgrade program includes a diesel engine, thermal sights, and secure communications. The Tank Laser Sight and Avimo LV10 Day/Night LRF sight can accept a thermal channel. Thermal sights are available for use on the tank.

British Main Battle Tank Chieftain Mk 5

	<table border="1"> <thead> <tr> <th>Weapons & Ammunition Types</th> <th>Typical Combat Load</th> </tr> </thead> <tbody> <tr> <td>120-mm rifled gun</td> <td>64</td> </tr> <tr> <td>APFSDS-T</td> <td>20</td> </tr> <tr> <td>HESH</td> <td>44</td> </tr> <tr> <td>7.62-mm MG</td> <td>6,200</td> </tr> <tr> <td>--Coaxial and Stowed</td> <td>6,000</td> </tr> <tr> <td>--Cupola AA MG</td> <td>200</td> </tr> </tbody> </table>	Weapons & Ammunition Types	Typical Combat Load	120-mm rifled gun	64	APFSDS-T	20	HESH	44	7.62-mm MG	6,200	--Coaxial and Stowed	6,000	--Cupola AA MG	200	
Weapons & Ammunition Types	Typical Combat Load															
120-mm rifled gun	64															
APFSDS-T	20															
HESH	44															
7.62-mm MG	6,200															
--Coaxial and Stowed	6,000															
--Cupola AA MG	200															
<p>SYSTEM Alternative Designations: FV 4201 Date of Introduction: 1967 Original Chieftain Proliferation: At least 6 countries Description: Crew: 4 Combat Weight (mt): 55.00 Chassis Length Overall (m): 7.48 Height Overall (m): 2.90 Width Overall (m): 3.51 Ground Pressure (kg/cm²): 0.90</p> <p>Automotive Performance: Engine Type: 750-hp Diesel Cruising Range (km): 400-500 Speed (km/h): Max Road: 48 Max Off-Road: INA Average Cross-Country: 30 Max Swim: N/A Fording Depths (m): 1.1 Unprepared</p> <p>Radio: C42/Larkspur VHF</p> <p>Protection: Armor, Turret Front (mm): 300 (RHA) Applique Armor (mm): ROMOR applique on turret, side skirts Explosive Reactive Armor (mm): N/A Active Protective System: N/A Mineclearing Equipment: Plow variant, and AVLB/engineer variant Self-Entrenching Blade: No NBC Protection System: Yes Smoke Equipment: Smoke grenade launchers (6 each side of turret)</p> <p>ARMAMENT Main Armaments: Caliber, Type, Name: 120-mm rifled gun, L11A5 Rate of Fire (rd/min): 8-10 first minute/6 sustained Loader Type: Separate-loading manual Ready/Stowed Rounds: INA Elevation (°): -10 to +20 Fire on Move: Yes</p> <p>Auxiliary Weapon: Caliber, Type, Name: 7.62-mm (7.62x 51) Machine gun L8A1 Mount Type: Turret Coax Maximum Aimed Range (m): INA Max Effective Range (m): Day: 800 Night: INA Fire on Move: Yes Rate of Fire: INA</p>	<p>Caliber, Type, Name: 7.62-mm (7.62x 51) AA Machine gun L37A1 Mount Type: Cupola Maximum Aimed Range (m): INA Max Effective Range (m): Day: 800 Night: INA Fire on Move: Yes Rate of Fire (rd/min): INA</p> <p>ATGM Launcher: N/A</p> <p>FIRE CONTROL FCS Name: Improved Fire Control System (IFCS) Main Gun Stabilization: 2-plane Rangefinder: Laser, Nd-Yag Infrared Searchlight: Yes Sights w/Magnification: Gunner: Day: Barr and Stroud Tank Laser Sight (TLS), 8x Field of View (°): 10 Acquisition Range (m): 5,000 Night: 1R18 Thermal sight, 3x Field of View (°): INA Acquisition Range (m): INA</p> <p>Commander Fire Main Gun: INA</p> <p>VARIANTS Mk 5: Final production variant, with a new engine and NBC system, modified auxiliary weapons and sights. Mk 6-11 are upgrades to earlier models, with addition of IFCS. Mk 12 added ROMOR (aka: Stillbrew) spaced armor boxes. Mk 11 and Mk 12 have Thermal Observation and Gunnery Sight (TOGS).</p> <p>A variety of support vehicles were developed from the tank. They include recovery vehicles, AVLB, dozer, mineclearer, air defense and 155-mm SP artillery systems.</p> <p>Khalid/Shir 1: Jordanian variant which has chassis, turret and weaponry of the Chieftain, but which incorporates engine and running gear upgrades of Challenger I. The fire control has seen a number of improvements, including a new ballistic computer.</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 120-mm APFSDS-T, L23A1 Maximum Aimed Range (m): 5,000 Max Effective Range (m): Day: 3,000 Night: INA Armor Penetration (mm): INA</p>															

Worldwide Equipment Guide

British Main Battle Tank Chieftain Mk 5 continued

120-mm High-Explosive Squash-Head (HESH), L31 Maximum Aimed Range (m): 5,000 Max Effective Range (m): Day: 3,000 Night: INA Armor Penetration (mm): INA	Other Ammunition Types: L15 APDS, L34 WP Smoke
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NOTES

Early Chieftains and some later modified tanks mount the 50. Cal M2HB machinegun over the main gun as a ranging gun. Iran and Kuwait retained the .50 Cal MG.

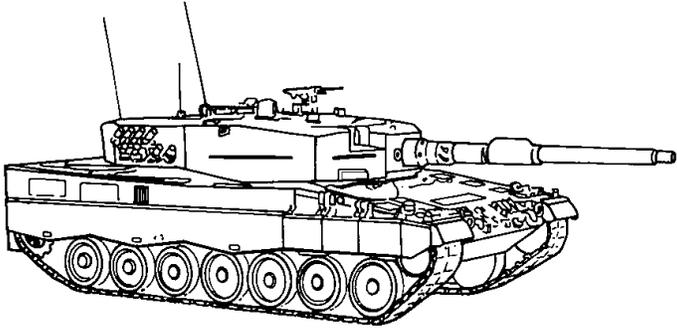
The HESH round is used for antitank chemical-energy (CE) antiarmor missions, and for HE effects against personnel and materiel.

The Iranians claim to employ a snorkel system on Chieftain, for fording to 5 meters depth.

A variety of fire control systems and thermal sights are available for Chieftain. At 324 Chieftains have been upgraded with the Barr and Stroud TOGS thermal sight system. The 1R26 thermal camera can be used with the 1R18 thermal night sight. It has wide (13.6°) and narrow (4.75°) fields of view, and is compatible with TOGS format. GEC Sensors offers a long list of sights including: Multisensors Platform, Tank Thermal Sensor, and SS100/110 thermal night sight. Marconi, Nanoquest, and Pilkington offer day and night sights for the Chieftain.

Charm Armament upgrade program, with the 120-mm L30 gun incorporated in Challenger 1, is available for Chieftain modification programs.

German Main Battle Tank Leopard 2

	Weapons & Ammunition Types	Typical Combat Load
	120-mm smoothbore gun APFSDS-T HEAT-MP-T	42
	7.62-mm machineguns	4750
	--Coaxial	2000
	--Cupola MG/stowed	2750

<p>SYSTEM Alternative Designations: Swiss Pz 87, Swedish Strv 121 Date of Introduction: 1979 Proliferation: At least 7 countries Description: Crew: 4 Combat Weight (mt): 55.15 Chassis Length Overall (m): 7.69 Height Overall (m): 2.79 Width Overall (m): 3.70 Ground Pressure (kg/cm²): 0.83</p> <p>Automotive Performance: Engine Type: 1,500-hp Diesel Cruising Range (km): 550 Speed (km/h): Max Road: 72 Max Off-Road: 45 Average Cross-Country: 40 Max Swim: N/A Fording Depths (m): 1.0 Unprepared, 4.0 with snorkel</p> <p>Radio: INA</p> <p>Protection: Armor, Turret Front (mm): 700 KE/1,000 against HEAT rounds Applique Armor (mm): Track skirt Explosive Reactive Armor (mm): N/A Active Protective System: Galix (See note Strv 122) Mineclearing Equipment: No Self-Entrenching Blade: No NBC Protection System: Yes Smoke Equipment: Smoke grenade launchers, 8 each side of turret</p> <p>ARMAMENT Main Armaments: Caliber, Type, Name: 120-mm smoothbore gun M256 Rate of Fire (rd/min): INA Loader Type: Manual Ready/Stowed Rounds: 15/27 Elevation (°): -9 to +20 Fire on Move: Yes</p> <p>Auxiliary Weapon: Caliber, Type, Name: 7.62-mm (7.62x 51) Machinegun MG3A1 Mount Type: Turret Coax Maximum Aimed Range(m): INA Max Effective Range (m): Day: INA Night: INA</p>	<p>Fire on Move: Yes Rate of Fire (rd/min): 1,200</p> <p>Caliber, Type, Name: 7.62-mm (7.62x 51) Machinegun MG3A1 Mount Type: Turret Cupola Maximum Aimed Range(m): INA Max Effective Range (m): Day: INA Night: INA Fire on Move: Yes Rate of Fire (rd/min): 1,200 ATGM Launcher: N/A</p> <p>FIRE CONTROL FCS Name: INA Main Gun Stabilization: WNA-H22, 2-plane Rangefinder: Laser neodymium Infrared Searchlight: Yes Sights w/Magnification: Gunner: Day: Krupp-Atlas EMES-15, 12x / FER0 Z18 secondary, 8x Field of View (°): 5/10 Acquisition Range (m): INA Night: Zeiss thermal imager Field of View (°): INA Acquisition Range (m): INA Commander Fire Main Gun: Yes</p> <p>VARIANTS A variety of MBT variants from 2A1 to 2A4 denote minor changes, as well as FCS upgrades. Combat support variants include an armored recovery vehicle.</p> <p>Pz87: Swiss variant with indigenous machineguns, communications and FCS, and improved NBC equipment.</p> <p>Dutch Leopard 2: Uses indigenous equipment as noted above.</p> <p>Leopard 2A5/Leopard 2 (Improved): Recent upgrade with spaced armor added to turret front, and increased armor on hull and side skirts. Other improvements include improved stabilization, suspension, navigation, fire control, and hatch design.</p> <p>Strv 122: Swedish-licensed variant resembling 2A5 with an indigenous turret and other upgrades. The tank features French Galix active protection system and improved command and control. Sweden developed an HE-T round designed to range 2,000 meters or more for its Leopard-2 and Strv-122 tanks. With additional armor, Strv 122 will weigh 62 mt.</p>
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German Main Battle Tank Leopard 2 continued

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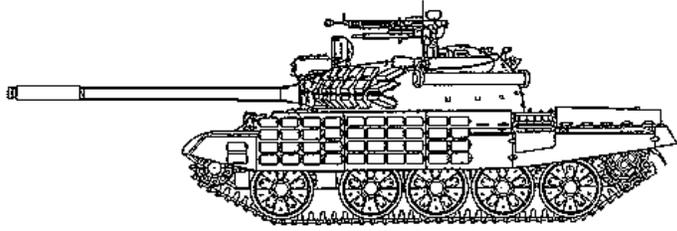
<p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 120-mm APFSDS-T, DM43 Maximum Aimed Range(m): 3,500 Max Effective Range (m): Day: INA Night: INA Armor Penetration (mm): 450 at 2,000 meters</p> <p>120-mm APFSDS-T, US Olin GD120 Maximum Aimed Range(m): 3,500 Max Effective Range (m): Day: 3,000 Night: INA Armor Penetration (mm): 520 at 2,000 meters</p>	<p>120-mm HEAT-MP-T, DM-12A1/US Olin M830 Maximum Aimed Range(m): INA Max Effective Range (m): Day: 2,500 Night: INA Armor Penetration (mm): INA</p> <p>Other Ammunition Types: US-produced M829, M829A1 APFSDS-T; US M830A1 HEAT-MP-T (MPAT), GE DM12A1 (US copy M830) HEAT-MP-T (MPAT)</p>
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NOTES

A variety of upgrade programs and options are available for the Leopard 2. These include the Atlas Elektronik Vehicle Integrated Command and Information System (IFIS), a digital command and information system.

A new longer gun barrel (L55 gun barrel, 1.30 meters longer) is available. It permits effective use of a new APFSDS-T round, DM53 (LKE II), with a longer rod penetrator, and which is under development. The German Army has decided not to buy the DM43 APFSDS-T round (aka: LKE 1), rather to wait and upgrade to the DM53.

Russian Main Battle Tank T-55AMV

	<p>Weapons & Ammunition Types</p> <p>100-mm rifled gun APFSDS-T HEAT Frag-HE ATGM</p> <p>7.62-mm coax PKT MG 12.7-mm AA MG</p>	<p>Typical Combat Load</p> <p>(mix est) 43 14 3 21 5</p> <p>1,250 500</p>
	<p>SYSTEM Alternative Designations: INA Date of Introduction: 1983 Proliferation: At least 3 countries Description: Crew: 4 Combat Weight (mt): 40.5 Chassis Length Overall (m): 6.20 Height Overall (m): 2.32 Width Overall (m): 3.60 Ground Pressure (kg/cm²): 0.89</p> <p>Automotive Performance: Engine Type: 620-690 hp Diesel Cruising Range (km): 390/600 with extra tanks Speed (km/h): Max Road: 50 Max Off-Road: 35 Average Cross-Country: 25 Max Swim: N/A Fording Depths (m): 1.4 Unprepared, 5.5 with snorkel</p> <p>Radio: R-173, R-173P, R-124 intercom</p> <p>Protection: Armor, Turret Front (mm): 200 (base T-55 armor) Applique Armor (mm): Rubber screens and box armor Explosive Reactive Armor (mm): 1st Gen raises to KE/700-900 against HEAT; 2nd Gen raises to 450-480 KE/700-900 HEAT Active Protective System: Russian Drozd APS available Mineclearing Equipment: Roller-plow set, and plows available Self-Entrenching Blade: No NBC Protection System: Yes Smoke Equipment: Smoke grenade launchers (4x 81-mm each side of turret), and 24 grenades. Vehicle engine exhaust smoke system</p> <p>ARMAMENT Main Armaments: Caliber, Type, Name: 100-mm rifled gun, D-10T2S Rate of Fire (rd/min): 5-7 Loader Type: Manual Ready/Stowed Rounds: INA Elevation (°): -5 to +18 Fire on Move: Yes (gun rounds only--ATGMs require a short halt)</p> <p>Auxiliary Weapon: Caliber, Type, Name: 7.62-mm (7.62x 54R) Machinegun PKT-T Mount Type: Turret coax Maximum Aimed Range (m): 2,000 Max Effective Range (m): Day: 800</p> <p>Night: 800 Fire on Move: Yes Rate of Fire (rd/min): 250 rpm practical, 800 cyclic, 2-10 rd bursts</p> <p>Caliber, Type, Name: 12.7-mm (12.7x108) AA MG DShKM Mount Type: Turret top Maximum Aimed Range (m): 2,000 Max Effective Range (m): Day: 1,500 Night: N/A Fire on Move: Yes Rate of Fire (rd/min): 80-100 practical, 600 cyclic, 2-10 rd bursts</p> <p>ATGM Launcher : Name: D-10T2S gun Launch Method: Gun-launched Guidance: SACLOS, Infrared laser-beam rider Command Link: Encoded laser-beam Launcher Dismountable: No</p> <p>FIRE CONTROL FCS Name: Volna Main Gun Stabilization: M1 Tsiklon 2-plane Rangefinder: KDT-2 Laser Infrared Searchlight: L-4 Sights w/Magnification: Gunner: Day: TShSM-32PV, 3.5x and 7x Field of View (°): 18 and 8 Acquisition Range (m): 4,000 Night: 1K13 Field of View (°): INA Acquisition Range (m): 800-1,300, gun rounds only</p> <p>Commander Fire Main Gun: No</p> <p>VARIANTS More than a dozen countries have produced upgraded T-55 variants with similar capabilities in protection and lethality. Many countries have upgraded to a larger main gun.</p> <p>T-55AMV is derived from a line of variants of T-55 MBT. T-55A added an NBC protection system. T-55M added the Volna fire control system (with ATGM launcher), improved gun stabilization and sights, improved engine, new radio, and increased protection. That included side skirts, smoke grenade launchers, applique armor, and fire protection. T-55AM added bra armor, an armor band around the turret for 180° coverage. The -AMV upgrade means substitution of ERA for the bra armor. Variants ending with -I denote replacement of the engine w/V-46 engine from T-72 MBT. The Ukraine and Syria will upgrade to the T-55AMV standard.</p>	

Russian Main Battle Tank T-55AMV continued

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<p>T-55AM2B: Czech version of T-55AMV with Kladivo fire control. T-55AM2: Variant does not have ATGM capability or Volna FCS. T-55AM2P: Polish version of T-55AMV but with Merida FCS. T-55AMD: Variant with the Drozd APS instead of ERA. T-55AD Drozd: Variant with Drozd but not Volna FCS and ERA.</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 100-mm BM-8 Russian Maximum Aimed Range (m): 2,500 Max Effective Range (m): Day: 1,500 Night: 800-1,300 Armor Penetration (mm): 200 at 1,000 meters</p> <p>100-mm APFSDS-T, BM-25 Maximum Aimed Range (m): 2,500 Max Effective Range (m): Day: INA Night: 800-1,300 Armor Penetration (mm): INA</p> <p>100-mm APFSDS-T, BM-412M, Romanian Maximum Aimed Range (m): 2,500 Max Effective Range (m): Day: 2,000+ (est) Night: 800-1,300 Armor Penetration (mm): 418 at 2,000 m, 380 at 3,000 m</p> <p>100-mm APFSDS-T, M1000, Belgian Maximum Aimed Range (m): 2,500 Max Effective Range (m): Day: 2,500 (est) Night: 800-1,300 Armor Penetration (mm): NATO triple heavy target, 4,500 m</p>	<p>100-mm HEAT, BK-17 Maximum Aimed Range (m): 2,500 Max Effective Range (m): Day: 1,000 (est) Night: 800-1,000 (est) Armor Penetration (mm): 380</p> <p>100-mm Frag-HE, OF-32 Maximum Aimed Range (m): 4,000 Max Effective Range (m): Day: <2,500 Night: 800-1,300 Armor Penetration (mm): INA</p> <p>Other Ammunition Types: A variety of other rounds within the range noted above are available. They include the GIAT NR 322/ NR 352 APFSDS-T and Slovak JPrSv AP-T with ranges beyond 2,000 m.</p> <p>Antitank Guided Missiles: Name: AT-10/BASTION Warhead Type: Shaped charge (HEAT) Armor Penetration (mm): 650 (RHA) Range (m): 4,000 (day only, see NOTES)</p> <p>Name: AT-10 Improved Warhead Type: Tandem shaped charge Armor Penetration (mm): 700 (RHA) behind ERA Range (m): 4,000 (day only, see NOTES)</p>
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NOTES

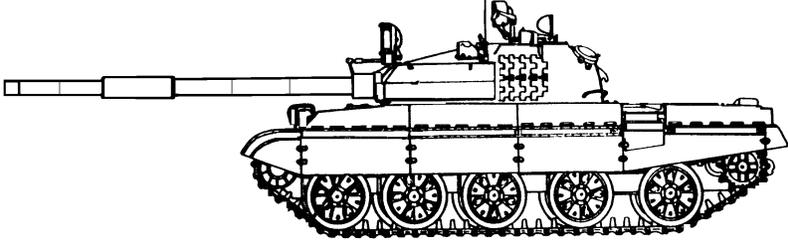
The 1K13 sight is both night sight and ATGM launcher sight; however, it cannot be used for both functions simultaneously.

T-55s with "bra armor", semi-circular add-on armor, have turret protection increased to 330 mm (KE) and 400-450 mm (CE). Other improvements available include a hull bottom reinforced against mines, better engines, rubber track pads, and a thermal sleeve for the gun.

Optional sights and fire control systems include the Israeli El-Op Red Tiger and Matador FCS, Swedish NobelTech T-series sight, and German Atlas MOLF. The Serbian SUV-T55A FCS, British Marconi Digital FCS, South African Tiger, and Belgian SABCA Titan offer upgraded function. One of the best is the Slovenian EFCS-3 integrated FCS.

A variety of thermal sights is available. They include the Russian/French ALIS and Namut-type sight from Peleng. There are thermal sights available for installation which permit night launch of ATGMs.

Russian Main Battle Tank T-62M

	<p>Weapons & Ammunition Types</p> <p>115-mm rifled gun APFSDS-T HEAT Frag-HE ATGM</p> <p>7.62-mm coax PKT MG</p>	<p>Typical Combat Load</p> <p>(mix est) 40</p> <p>12 3 20 5</p> <p>2,500</p>
<p>SYSTEM Alternative Designations: INA Date of Introduction: 1983 Proliferation: At least 1 country</p> <p>Description: Crew: 4 Combat Weight (mt): 41.5 Chassis Length Overall (m): 6.63 Height Overall (m): 2.4 Width Overall (m): 3.52 Ground Pressure (kg/cm²): INA</p> <p>Automotive Performance: Engine Type: 620-hp Diesel Cruising Range (km): 450/650 with extra tanks Speed (km/h): Max Road: 45 Max Off-Road: INA Average Cross-Country: INA Max Swim: N/A Forcing Depths (m): 1.4 Unprepared, 5.5 with snorkel</p> <p>Radio: R-173, R-173P, R-124 intercom</p> <p>Protection: Armor, Turret Front (mm): 230 Applique Armor (mm): Bra armor (+100 on turret) and track skirts Explosive Reactive Armor (mm): Available, replaces bra armor Active Protective System: Russian Drozd APS will fit Mineclearing Equipment: Roller-plow set, and plows Self-Entrenching Blade: No NBC Protection System: Nuclear radiation only Smoke Equipment: Vehicle engine exhaust smoke system 2 x 4 Smoke grenade launchers</p> <p>ARMAMENT Main Armaments: Caliber, Type, Name: 115-mm smoothbore gun, 2A20/Sheksna Rate of Fire (rd/min): 3-5 Loader Type: Manual Ready/Stowed Rounds: INA Elevation (°): -5 to +18 Fire on Move: Yes (gun rounds only--ATGMs require a short halt)</p> <p>Auxiliary Weapon: Caliber, Type, Name: 7.62-mm (7.62x 54R) machinegun PKT Mount Type: Turret coax Maximum Aimed Range (m): 2,000 Max Effective Range (m): Day: 800 Night: 800</p>	<p>Fire on Move: Yes Rate of Fire (rd/min): 250 rpm practical, 800 cyclic, 2-10 rd bursts</p> <p>ATGM Launcher: Name: 2A20 gun Launch Method: Gun-launched Guidance: SACLOS, Infrared laser-beam rider Command Link: Encoded laser-beam Launcher Dismountable: No</p> <p>FIRE CONTROL FCS Name: Volna Main Gun Stabilization: M1 Meteor 2-plane Rangefinder: KTD-2 Laser Infrared Searchlight: L-4 Sights w/Magnification: Gunner: Day: TShSM-41U, 3.5x and 7x Field of View (°): 18 and 8 Acquisition Range (m): 4,000 Night: 1K13-1 Field of View (°): INA Acquisition Range (m): 850-1,300, gun rounds only Commander Fire Main Gun: No</p> <p>VARIANTS T-62M is one of a variety of T-62 variants. T-62A: added a 12.7-mm MG. T-62M adds protection, FCS and ATGM capability. T-62 variants with a V-46 T-72-type engine add -1 to their designation. T-62M1: Variant with Volna FCS but no missile launch capability. T-62D: Variant with the Drozd APS vs ERA. T-62MK: Command variant. T-62MV: Version with ERA in place of the bra armor. The ERA includes Kontakt ERA and Kontakt-5 2nd-Generation ERA.</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 115-mm APFSDS-T, BD/36-2 Maximum Aimed Range (m): 3,000 Max Effective Range (m): Day: 2,000+ (est) Night: 850-1,300 Armor Penetration (mm): 520 (RHA, 71° angle) at 1,000 m</p> <p>115-mm APFSDS-T, BM-6 Russian Maximum Aimed Range(m): 3,000 Max Effective Range (m): Day: 1,500 Night: 850-1,300 Armor Penetration (mm): 237 (RHA) at 1,000 m</p>	

Russian Main Battle Tank T-62M

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<p>115-mm HEAT, BK-4 Maximum Aimed Range (m): 1,500 (est) Max Effective Range (m): Day: 1,200 Night: 850-1,200 Armor Penetration (mm): 495 (RHA)</p> <p>115-mm Frag-HE-T, OF-27 Maximum Aimed Range (m): 4,000 Max Effective Range (m): Day: 1,500-2,000 Night: 850-1,300 Armor Penetration (mm): INA</p> <p>Other Ammunition Types: BM-3 APFSDS, BM-4 APFSDS, BK-4M HEAT, BK-15 HEAT, OF-11 Frag-HE, OF-18 Frag-HE</p>	<p>Antitank Guided Missiles Name: AT-10/Sheksna Warhead Type: Shaped charge (HEAT) Armor Penetration (mm): 650 Range (m): 4,000 (day only, see NOTES)</p> <p>Name: AT-10 Improved Warhead Type: Tandem shaped charge Armor Penetration (mm): 700 behind ERA Range (m): 4,000 (day only, see NOTES)</p>
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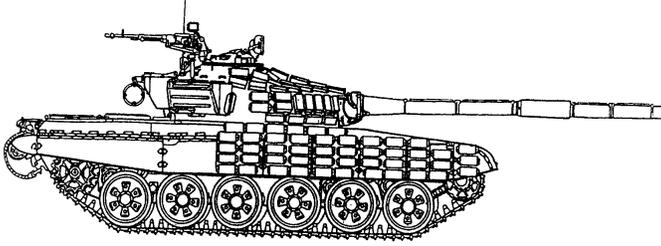
The 1K13 sight is both night sight and ATGM launcher sight; however, it cannot be used for both functions simultaneously.

Other improvements available include a hull bottom reinforced against mines, rubber track pads, and a thermal sleeve for the gun.

Optional sights and fire control systems include the Israeli El-Op Red Tiger and Matador FCS, Swedish NobelTech T-series sight, and German Atlas MOLF. The British Marconi Digital FCS, South African Tiger, and Belgian SABCA Titan offer upgraded function. One of the best is the Slovenian EFCS-3 integrated FCS.

A variety of thermal sights is available. They include the Russian Agava, French SAGEM-produced ALIS and Namut sight from Peleng. There are thermal sights available for installation which permit night launch of ATGMs.

Russian Main Battle Tank T-72B

 <p style="text-align: center;">T-72B w/Kontakt ERA</p>	<table border="1"> <thead> <tr> <th>Weapons & Ammunition Types</th> <th>Typical Combat Load</th> </tr> </thead> <tbody> <tr> <td>125-mm smoothbore gun</td> <td>45</td> </tr> <tr> <td>APFSDS-T</td> <td>(mix est) 15</td> </tr> <tr> <td>HEAT</td> <td>3</td> </tr> <tr> <td>Frag-HE</td> <td>21</td> </tr> <tr> <td>ATGM</td> <td>6</td> </tr> <tr> <td>7.62-mm coax MG</td> <td>2,000</td> </tr> <tr> <td>12.7-mm AA MG</td> <td>300</td> </tr> </tbody> </table>	Weapons & Ammunition Types	Typical Combat Load	125-mm smoothbore gun	45	APFSDS-T	(mix est) 15	HEAT	3	Frag-HE	21	ATGM	6	7.62-mm coax MG	2,000	12.7-mm AA MG	300	
Weapons & Ammunition Types	Typical Combat Load																	
125-mm smoothbore gun	45																	
APFSDS-T	(mix est) 15																	
HEAT	3																	
Frag-HE	21																	
ATGM	6																	
7.62-mm coax MG	2,000																	
12.7-mm AA MG	300																	
<p>SYSTEM Alternative Designations: T-72S (export), SMT M1988 Date of Introduction: 1985 Proliferation: At least 2 countries Description: Crew: 3 Combat Weight (mt): 44.5 Chassis Length Overall (m): 6.91 Height Overall (m): 2.19 Width Overall (m): 3.58 Ground Pressure (kg/cm²): 0.90</p> <p>Automotive Performance: Engine Type: 840-hp Diesel Cruising Range (km): 500/ 900 with external tanks Speed (km/h): Max Road: 60 Max Off-Road: 45 Average Cross-Country: 35 Max Swim: N/A Fording Depths (m): 1.2 Unprepared/5.0 with snorkel Radio: R-173 and R-134</p> <p>Protection: Armor, Turret Front (mm): 520/950 against HEAT Applique Armor (mm): Side of hull over track skirt, turret top Explosive Reactive Armor (mm): Kontakt or Kontakt-5 ERA Active Protective System: Arena available Mineclearing Equipment: Roller-plow set, and plows available Self-Entrenching Blade: Yes NBC Protection System: Yes Smoke Equipment: Smoke grenade launchers (8x 81-mm left side of turret), and 32 grenades. Vehicle engine exhaust smoke system.</p> <p>ARMAMENT Main Armament: Caliber, Type, Name: 125-mm smoothbore gun 2A46M/ D-81TM Rate of Fire (rd/min): 4-6/2 in manual mode Loader Type: Autoloader (separate loading) and manual Ready/Stowed Rounds: 22/23 Elevation (°): -6 to +14 Fire on Move: Yes, up to 25 km/h. Depending on the road and distance to the target, most crews may halt before firing.</p> <p>Auxiliary Weapon: Caliber, Type, Name: 7.62-mm (7.62x 54R) Machinegun PKT Mount Type: Turret coax Maximum Aimed Range (m): 2,000 Max Effective Range (m): Day: 1,000 Night: 800</p>	<p>Fire on Move: Yes Rate of Fire (rd/min): 250 practical, 600 cyclic in 2-10 round bursts</p> <p>Caliber, Type, Name: 12.7-mm (12.7x108) AA MG NSVT Mount Type: Turret top Maximum Aimed Range (m): 2,000 Max Effective Range (m): Day: 1,500/1,000 antiaircraft Night: N/A Fire on Move: Yes Rate of Fire (rd/min): 200 practical, 600 cyclic in bursts</p> <p>ATGM Launcher: Name: 2A46M Launch Method: Gun-launched Guidance: SACLOS, Laser beam rider Command Link: Encoded infrared laser beam Launcher Dismountable: No</p> <p>FIRE CONTROL FCS Name: 1A40-1 Main Gun Stabilization: 2E42-2, 2-plane Rangefinder: TPD-K1M laser rangefinder Infrared Searchlight: Yes Sights w/Magnification: Gunner: Day: TPD-K1, 8 Field of View (°): 9 Acquisition Range (m): 3,000 with LRF, 5,000 without ATGM/Night: 1K13-495 5.6x (8x ATGM) Field of View (°): 6, 40 min (5 ATGM) Acquisition Range (m): INA Commander Fire Main Gun: No</p> <p>VARIANTS T-72BK: Commander's variant with additional radios</p> <p>T-72BM: Version with Kontakt-5 explosive reactive armor. This system is being fielded and is available for export.</p> <p>T-72S/Shilden: Russian export T-72A upgraded to be comparable to the T-72BM standard. Although similar to the T-72BM, it may have less turret front protection. The early T-72S tank has Kontakt ERA, as shown above.</p> <p>T-90: Successor to T-72BM. This tank has been tentatively approved for production and adoption as a standard tank, alongside the T-80U, for the Russian army. The T-90 uses the gun and 1G46 gunner sights from T-80U, a new engine, and thermal sights. Protective measures include Kontakt-5 ERA, laser warning receivers, and the SHTORA infrared ATGM jamming system.</p>																	

Russian Main Battle Tank T-72B continued

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<p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 125-mm APFSDS-T, BM-42M Maximum Aimed Range (m): 3,000 Max Effective Range (m): Day: 2,000-3,000 Night: 850-1,300 Armor Penetration (mm): 590-630 at 2,000 meters</p> <p>125-mm Frag-HE-T, OF-26 Maximum Aimed Range (m): 5,000 Max Effective Range (m): Day: INA Night: 850-1,300 Armor Penetration (mm): INA</p> <p>125-mm HEAT-MP, BK-29M Maximum Aimed Range (m): 3,000 Max Effective Range (m): Day: INA Night: 850-1300 Armor Penetration (mm): 650-750</p>	<p>125-mm HEAT, BK-27 Maximum Aimed Range (m): 3,000 Max Effective Range (m): Day: INA Night: 850-1,300 Armor Penetration (mm): 700-800</p> <p>Other Ammunition Types: Giat 125G1 APFSDS-T, Russian BM-42 and BM-32 APFSDS-T. Note: The Russians may have a version of the BM-42M with a DU penetrator.</p> <p>Antitank Guided Missiles: Name: AT-11/SVIR Warhead Type: Shaped charge (HEAT) Armor Penetration (mm): 700 behind ERA/800 conventional Range (m): 4,000</p> <p>Name: AT-11B/INVAR Warhead Type: Tandem Shaped charge (HEAT) Armor Penetration (mm): 800 behind ERA /870 conventional Range (m): 4,000</p>
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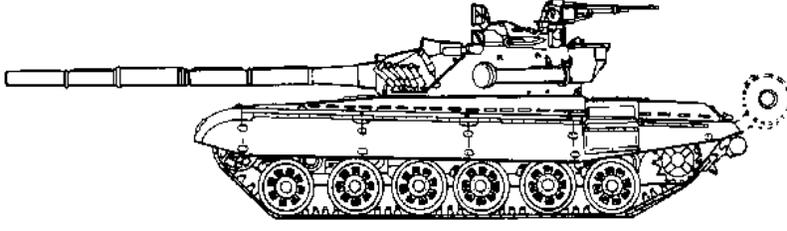
NOTES

The T-72B is the second main variant from the original Russian T-72 tank (after T-72A).

The 1K13-49 sight is both night sight and ATGM launch sight. However, it cannot be used for both functions simultaneously. A variety of thermal sights is available. They include the Russian Agava-2, French SAGEM-produced ALIS and Namut sight from Peleng. Thermal gunner night sights are available which permit night launch of ATGMs.

The more recent BK-27 HEAT round offers a triple-shaped charge warhead and increased penetration against conventional armors and ERA. The BK-29 round, with a hard penetrator in the nose is designed for use against reactive armor, and as an MP round has fragmentation effects. If the BK-29 HEAT-MP is used, it may substitute for Frag-HE (as with NATO countries) or complement Frag-HE. With three round natures (APFSDS-T, HEAT-MP, ATGMs) in the autoloader vs four, more antitank rounds would be available for the higher rate of fire.

Polish/Czechoslovakian Main Battle Tank T-72M1

	Weapons & Ammunition Types 125-mm smoothbore gun APFSDS-T HEAT Frag-HE 7.62-mm coax MG 12.7-mm AA MG	Typical Combat Load 44 (mix est) 15 7 22 2,000 300
<p>SYSTEM Alternative Designations: Russian T-72A Date of Introduction: 1975 Proliferation: At least 7 countries</p> <p>Description: Crew: 3 Combat Weight (mt): 41.5 (without ERA) Chassis Length Overall (m): 6.91 Height Overall (m): 2.19 Width Overall (m): 3.59 Ground Pressure (kg/cm²): 0.90</p> <p>Automotive Performance: Engine Type: 780-hp Diesel Cruising Range (km): 460/700 with extra tanks Speed (km/h): Max Road: 60 Max Off-Road: 45 Average Cross-Country: 35 Max Swim: N/A Fording Depths (m): 1.2 Unprepared/5.0 with snorkel</p> <p>Radio: R-173M</p> <p>Protection: Armor, Turret Front (mm): 500/560 against HEAT Applique Armor (mm): Side of hull over track skirt, turret top Explosive Reactive Armor (mm): 1st or 2nd Gen ERA available Active Protective System: Arena or Drozd available Mineclearing Equipment: Roller-plow set, and plows available Self-Entrenching Blade: Yes NBC Protection System: Yes Smoke Equipment: Smoke grenade launchers (6x 81-mm each side of turret), and 24 grenades. Vehicle engine exhaust smoke system.</p> <p>ARMAMENT Main Armaments: Caliber, Type, Name: 125-mm smoothbore gun 2A46M/ D-81TM Rate of Fire (rd/min): 4-6/2 in manual mode Loader Type: Autoloader (separate loading) and manual Ready/Stowed Rounds: 22/22 (22 in carousel) Elevation (°): -6 to +14 Fire on Move: Yes, up to 25 km/h. Depending on the road and distance to the target, most crews may halt before firing.</p> <p>Auxiliary Weapon: Caliber, Type, Name: 7.62-mm (7.62x 54R) Machinegun PKT Mount Type: Turret coax Maximum Aimed Range (m): 1,800</p>	<p>Max Effective Range (m): Day: 1,000 Night: 800 Fire on Move: Yes Rate of Fire (rd/min): 250 practical, 600 cyclic in 2-10 round bursts</p> <p>Caliber, Type, Name: 12.7-mm (12.7x108) AA MG NSVT Mount Type: Turret top Maximum Aimed Range (m): 2,000 Max Effective Range (m): Day: 1,500, 1,000 AA Night: N/A Fire on Move: Yes Rate of Fire (rd/min): 200 practical, 600 cyclic in bursts</p> <p>ATGM Launcher: N/A</p> <p>FIRE CONTROL FCS Name: INA Main Gun Stabilization: 2E28M, 2-plane Rangefinder: TPD-K1 laser rangefinder Infrared Searchlight: Yes Sights w/Magnification: Gunner: Day: TPD-K1 laser rangefinder sight, 8 x Field of View (°): 9 Acquisition Range (m): 3,000 with LRF, 5000 without Night: TPN-1-49, 5.5 x Field of View (°): 6 Acquisition Range (m): 800</p> <p>Commander Fire Main Gun: No</p> <p>VARIANTS T-72: Original Russian tank from which T-72 variants were derived.</p> <p>T-72M: Original Polish and former-Czechoslovakian T-72-series tank from which Polish/Czechoslovakian T-72M1 was derived. T-72M differs from T-72 in replacing the right-side coincident rangefinder with a centerline-mounted TPDK-1 LRF.</p> <p>T-72A: The Russian variant differs from T-72 with the TPDK-1 LRF, added sideskirts, additional armor on the turret front and top, smoke grenade launchers, internal changes, and a slight weight increase. The Russian export version and Polish/Czechoslovakian counterparts are called T-72M1. Versions with Kontakt ERA are known as T-72AV / T-72 M1V. Please note that some countries have inventories of T-72, T-72M and T-72M1, with different versions of each variant. Also, many variants were upgraded or modified. Some T-72M1s do not have smoke grenade launchers or track skirts. Some T-72s/T-72Ms have smoke grenade launchers. More reliable discriminators are armor and rangefinder/FCS.</p>	

Polish/Czechoslovakian Main Battle Tank T-72M1 continued

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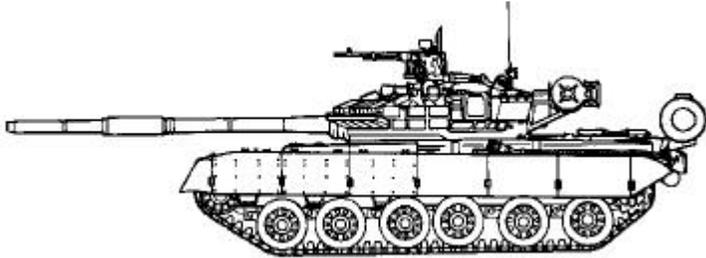
<p>T-72AK/7T-2M1K: Commander's variant with additional radios</p> <p>T-72AM/Banan: Ukrainian T-72A upgrade with ERA, a new engine, and additional smoke grenade launchers. The T-72AG upgrade has a 1200-hp engine, Shtora-1 ATGM jammer, and 1G46 (T-80U) FCS with thermal night sights.</p> <p>T-72M1M: T-72M1 variant upgraded to T-72B standard.</p> <p>T-72M2/Moderna. Slovakian T-72M upgrade with new engine and fire control, SFIM thermal sight, laser warning receiver, ERA, and 2 x 20-mm AA guns on turret</p> <p>T-72M4CZ: Czech variant with TURMS FCS with thermal sight, new engine, increased protection ERA, and 48t weight. T72M3CZ is a less radical upgrade-- for instance existing engine is modified.</p> <p>T-72MP: Ukrainian upgrade with a 1,000-hp engine, added armor, Shtora-1, and SAGEM FCS and thermal sights.</p> <p>T-72S/Shilden: Russian export T-72A upgraded to T-72B standard.</p> <p>M-84: Former Yugoslavian tank upgraded to T-72M1 standard, but with indigenous sights. With an upgraded engine, the tank is M-84A. A Croatian improved version of M-84 is M84A4/Sniper, with improved fire control and thermal night sights. A Slovenian upgrade uses the state-of-the-art and the well-marketed EFCS-3 FCS.</p> <p>PT-91/Twardy: Polish upgrade tank with ERA, laser warning receiver, smoke grenade launchers, and Tiger fire control system. Sights include a thermal gunner night sight.</p>	<p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name:</p> <p>125-mm APFSDS-T, BM-42M Maximum Aimed Range (m): 3,000 Max Effective Range (m): Day: 2,000-3,000 Night: 850-1,300 Armor Penetration (mm): 590-630 at 2,000 meters</p> <p>125-mm Frag-HE-T, OF-26 Maximum Aimed Range (m): 5,000 Max Effective Range (m): Day: INA Night: 850-1,300 Armor Penetration (mm): INA</p> <p>125-mm HEAT-MP, BK-29M Maximum Aimed Range (m): 3,000 Max Effective Range (m): Day: INA Night: 850-1300 Armor Penetration (mm): 650-750</p> <p>125-mm HEAT, BK-27 Maximum Aimed Range (m): 3,000 Max Effective Range (m): Day: INA Night: 850-1,300 Armor Penetration (mm): 700-800</p> <p>Other Ammunition Types: Giat 125G1 APFSDS-T, Russian BM-42 and BM-32 APFSDS-T. Note: The Russians may have a version of the BM-42M with a DU penetrator.</p>
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NOTES

A variety of thermal sights is available. They include the Russian Agava-2, French SAGEM-produced ALIS and Namut sight from Peleng.

The more recent BK-27 HEAT round offers a triple-shaped charge warhead and increased penetration against conventional armors and ERA. The BK-29 round, with a hard penetrator in the nose is designed for use against reactive armor, and as an MP round has fragmentation effects. If the BK-29 HEAT-MP is used, it may substitute for Frag-HE (as with NATO countries) or complement Frag-HE. With three round natures (APFSDS-T, HEAT-MP, ATGMs) in the autoloader vs four, more antitank rounds would be available for the higher rate of fire.

Russian Main Battle Tank T-80B

	<p>Weapons & Ammunition Types</p> <p>125-mm smoothbore gun APFSDS-T HEAT Frag-HE ATGM</p> <p>7.62-mm coax MG 12.7-mm NSVT AA MG</p>	<p>Typical Combat Load</p> <p>45 (mix est) 15 3 21 6</p> <p>1,250 500</p>
	<p>SYSTEM Alternative Designations: See NOTES Date of Introduction: 1978 Proliferation: At least 1 country Description: Crew: 3 Combat Weight (mt): 44.5 Chassis Length Overall (m): 6.98 Height Overall (m): 2.22 Width Overall (m): 3.58 Ground Pressure (kg/cm²): 0.87</p> <p>Automotive Performance: Engine Type: 1,000-hp or 1,100-hp Gas turbine (multifuel), Cruising Range (km): 370/ 500 with extra tanks Speed (km/h): Max Road: 70 Max Off-Road: 48 Average Cross-Country: 40 Max Swim: N/A Fording Depths (m): 1.8 Unprepared, 5.0 w/snorkel, 12.0 with BROD-M system</p> <p>Radio: R-173, R-174 intercom</p> <p>Protection: Armor, Turret Front (mm): Defeat 120-mm rounds (triple layer) Applique Armor (mm): N/A Explosive Reactive Armor (mm): 1st Generation ERA available Active Protective System: Available Mineclearing Equipment: Mine rollers and plows available Self-Entrenching Blade: Yes NBC Protection System: Yes Smoke Equipment: Smoke grenade launchers (4x 81-mm each side of turret), and 24 grenades. Vehicle engine exhaust smoke system</p> <p>ARMAMENT Main Armaments: Caliber, Type, Name: 125-mm smoothbore gun 2A46-2 Rate of Fire (rd/min): 6-8 (lower in manual mode) Loader Type: KORZINA separate-loading autoloader and manual Ready/Stowed Rounds: 28 in carousel/17 rounds stowed but readily available for manual loading Elevation (°): -7 to +20 Fire on Move: Yes (30 km/h gun rounds/low speed or stop ATGMs)</p> <p>Auxiliary Weapon: Caliber, Type, Name: 7.62-mm (7.62x 54R) Machinegun PKT Mount Type: Turret coax Maximum Aimed Range (m): 2,000</p> <p>Max Effective Range (m): Day: 1,000 Night: 850-1,300 Fire on Move: Yes Rate of Fire (rd/min): 250 practical / 650 cyclic, 2-10 round bursts</p> <p>Caliber, Type, Name: 12.7-mm (12.7x108) AA MG NSVT Mount Type: Turret top Maximum Aimed Range (m): 2,000 Max Effective Range (m): Day: 1,500 ground/1,600 for air targets (APDS) Night: 800-1,300 Fire on Move: Yes Rate of Fire (rd/min): 210 practical/ 800 air targets in bursts</p> <p>ATGM Launcher: Name: 2A46-2 tank gun Launch Method: Gun-launched Guidance: SACLOS Command Link: Encoded radio frequency Launcher Dismountable: No</p> <p>FIRE CONTROL FCS Name: FCS 1A33 Main Gun Stabilization: 2E26M 2-plane Rangefinder: Laser Infrared Searchlight: Yes Sights w/Magnification: Gunner: Day: 1G42 Field of View (°): INA Acquisition Range (m): 5,000 Night: 1-4A Field of View (°): INA Acquisition Range (m): 800-1,300 (est) Commander Fire Main Gun: No</p> <p>VARIANTS T-80BV: Variant noted in the above line drawing has ERA mounted. This variant is more likely for encounter by US forces.</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 125-mm APFSDS-T, BM-42M Maximum Aimed Range (m): 3,000-4,000 Max Effective Range (m): Day: 2,000-3,000 Night: 850-1,300 Armor Penetration (mm): 590-630 at 2,000 meters</p>	

Russian Main Battle Tank T-80B continued

Worldwide Equipment Guide

<p>125-mm Frag-HE-T, OF-26 Maximum Aimed Range (m): 5,000 Max Effective Range (m): Day: INA Night: 850-1,300 Armor Penetration (mm): INA</p> <p>125-mm HEAT-MP, BK-29M Maximum Aimed Range (m): 4,000 Max Effective Range (m): Day: 2,000-3,000 Night: 850-1300 Armor Penetration (mm): 650-750</p> <p>125-mm HEAT, BK-27 Maximum Aimed Range (m): 4,000 Max Effective Range (m): Day: 2,000-3,000 Night: 850-1,300 Armor Penetration (mm): 700-800</p>	<p>Other Ammunition Types: Giat 125G1 APFSDS-T, Russian BM-42 and BM-32 APFSDS-T. Note: The Russians may have a version of the BM-42M with a DU penetrator.</p> <p>Antitank Guided Missile: Name: AT-8/SONGSTER Warhead Type: Shaped charge (HEAT) Armor Penetration (mm): 700 (RHA) conventional Range (m): 4,000</p>
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NOTES

The T-80B and -BV variants are often misidentified as T-80. They are visibly different and bear other distinctions, such as T-80B/-BV capability for launching AT-8/ Songster ATGM.

The night sight cannot be used to launch the ATGM. The daysight can be used at night for launching ATGMs if the target is illuminated.

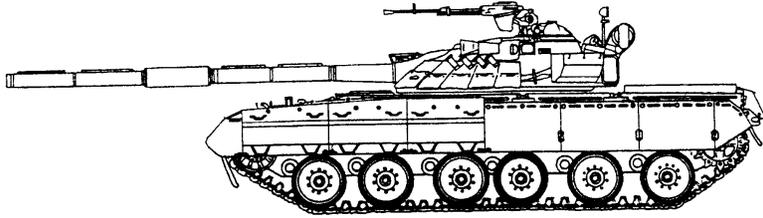
A variety of thermal sights is available. They include the Russian Agava-2, French SAGEM-produced ALIS and Namut sight from Peleng. There are thermal sights available for installation which permit night launch of ATGMs.

The 12.7-mm MG NSVT has both remote electronically operated sight PZU-5 and gun-mounted K10-T reflex sight.

The more recent BK-27 HEAT round offers a triple-shaped charge warhead and increased penetration against conventional armors and ERA. The BK-29 round, with a hard penetrator in the nose is designed for use against reactive armor, and as an MP round has fragmentation effects. If the BK-29 HEAT-MP is used, it may substitute for Frag-HE (as with NATO countries) or complement Frag-HE. With three round natures (APFSDS-T, HEAT-MP, ATGMs) in the autoloader vs four, more antitank rounds would be available for the higher rate of fire.

The ATGM may be launched while moving slowly (NFI). The AT-8 can be auto-loaded with the two halves mated during ramming; but the stub charge is manually loaded.

Russian Main Battle Tank T-80U

	<p>Weapons & Ammunition Types</p> <p>125-mm smoothbore gun APFSDS-T HEAT Frag-HE ATGM</p> <p>7.62-mm coax MG 12.7-mm NSVT AA MG</p>	<p>Typical Combat Load</p> <p>45 (mix est) 15 3 21 6</p> <p>1,250 500</p>
	<p>SYSTEM Alternative Designations: SMT (Soviet Medium Tank) M1989 Date of Introduction: 1987 Proliferation: At least 3 countries Description: Crew: 3 Combat Weight (mt): 46.0 Chassis Length Overall (m): 7.01 Height Overall (m): 2.20 Width Overall (m): 3.60 Ground Pressure (kg/cm²): 0.92</p> <p>Automotive Performance: Engine Type: 1250-hp Gas turbine (multi-fuel), diesel on T-80UD Cruising Range (km): 335 km/600 km with extra tanks Speed (km/h): Max Road: 70 Max Off-Road: 48 Average Cross-Country: 40 Max Swim: N/A Forcing Depths (m): 1.8 Unprepared, 5.0 w/snorkel, 12.0 with BROD-M system</p> <p>Radio: R-173, R-174 intercom</p> <p>Protection: Armor, Turret Front (mm): Against 120-mm ammunition Applique Armor (mm): Side of hull , over track skirt Explosive Reactive Armor (mm): Kontakt-5 2nd Generation ERA Active Protective System: ARENA is available Mineclearing Equipment: Roller-plow set and plows available Self-Entrenching Blade: Yes NBC Protection System: Yes Smoke Equipment: Smoke grenade launchers (4x 81-mm each side of turret), and 24 grenades. Vehicle engine exhaust smoke system.</p> <p>ARMAMENT Main Armaments: Caliber, Type, Name: 125-mm smoothbore gun 2A46M-1 Rate of Fire (rd/min): 7-8 (lower in manual mode) Loader Type: KORZINA separate-loading autoloader, and manual Ready/Stowed Rounds: 28 in carousel/17 stowed (manual loaded) Elevation (°): -4 to +18 Fire on Move: Yes (gun rounds and ATGMs)</p> <p>Auxiliary Weapon: Caliber, Type, Name: 7.62-mm (7.62x 54R) Machinegun PKT Mount Type: Turret coaxial Maximum Aimed Range (m): 2,000</p> <p>Max Effective Range (m): Day: 800 Night: 800 Fire on Move: Yes Rate of Fire (rd/min): 250 practical / 650 cyclic, 2-10 round bursts</p> <p>Caliber, Type, Name: 12.7-mm (12.7x108) AA MG NSVT Mount Type: Turret top Maximum Aimed Range (m): 2,000 Max Effective Range (m): Day: 1,500 Night: 800-1,300 Fire on Move: Yes Rate of Fire (rd/min): 210 practical/ 800 air targets in bursts</p> <p>ATGM Launcher: Name: 2A46M-1 tank gun Launch Method: Gun-launched Guidance: SACLOS, Laser-beam rider Command Link: Encoded infrared laser-beam Launcher Dismountable: No</p> <p>FIRE CONTROL FCS Name: FCS 1A42 Main Gun Stabilization: 2342, 2-plane Rangefinder: Laser Infrared Searchlight: Yes Sights w/Magnification: Gunner: Day: 1G46/PERFECT, 3.6/12x Field of View (°): INA Acquisition Range (m): 5,000 (70%P-hit for ATGM) Night: AGAVA-2 Field of View (°): INA Acquisition Range (m): 2,600 (gun rounds only)</p> <p>Commander Fire Main Gun: Yes</p> <p>VARIANTS T-80UD: Version produced in the Ukraine with a 1000-hp diesel engine instead of the turbine engine, and 1st generation ERA. T-80UK: Command version with R-163-50K and R-163-U radios, TNA-4 land navigation system, and an electronic fuze-setting device that permits use of Ainet Shrapnel Round. The AGAVA thermal sight provides a 2,600-meter night acquisition range. T-84: Recent Ukrainian upgrade of T-80UD with a welded turret, a French ALIS thermal sight, a more powerful engine, optional use of ARENA active protection system (APS) and SHTORA-1 active IR ATGM jammer system. Prototypes have been demonstrated, and the tank is available for export.</p>	

Russian Main Battle Tank T-80U continued

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<p>MAIN ARMAMENT AMMUNITION</p> <p>Caliber, Type, Name: 125-mm APFSDS-T, BM-42M Maximum Aimed Range (m): 3,000-4,000 Max Effective Range (m): Day: 2,000-3,000 Night: 800-1,300 Armor Penetration (mm): 590-630 at 2,000 meters</p> <p>125-mm HE-Shapnel Focused-fragmentation, Ainet Maximum Aimed Range (m): 5,000 Max Effective Range (m): Day: 4,000 Night: 800-1,300 Tactical AA Range: 4,000-5,000 Armor Penetration (mm): INA</p> <p>125-mm Frag-HE-T, OF-26 Maximum Aimed Range (m): 5,000 Max Effective Range (m): Day: INA Night: 800-1,300 Armor Penetration (mm): INA</p> <p>125-mm HEAT-MP, BK-29M Maximum Aimed Range (m): 4,000 Max Effective Range (m): Day: INA Night: 800-1300 Armor Penetration (mm): 650-750</p>	<p>125-mm HEAT, BK-27 Maximum Aimed Range (m): 4,000 Max Effective Range (m): Day: INA Night: 800-1,300 Armor Penetration (mm): 700-800</p> <p>Other Ammunition Types: Giat 125G1 APFSDS-T, Russian BM-42 and BM-32 APFSDS-T. Note: The Russians may have a version of the BM-42M with a DU penetrator.</p> <p>Antitank Guided Missiles: Name: AT-11/SVIR Warhead Type: Shaped charge (HEAT) Armor Penetration (mm): 700 (RHA) behind ERA/800 conventional Range (m): 5,000</p> <p>Name: AT-11B/INVAR Warhead Type: Tandem shaped charge Armor Penetration (mm): 800 (RHA) behind ERA /870 conventional Range (m): 5,000</p>
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NOTES

Line drawing is a T-80UD.

GTA-18A Auxiliary Power Unit is used when the engine is off.

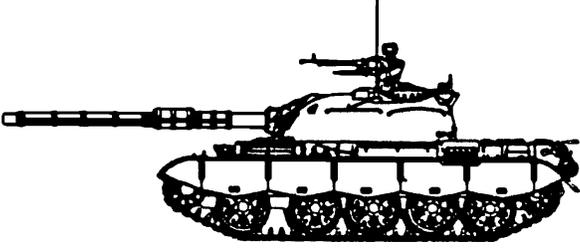
The BK-29 round, with a hard penetrator in the nose is designed for use against reactive armor, and as an MP round has fragmentation effects. The more recent BK-27 HEAT round offers a triple-shaped charge warhead and 50 mm more penetration.

The electronic round fuzing system for Ainet rounds is available for other tanks. This round uses technology similar to that for French Oerlikon's AHEAD rounds. The round is specially designed to defeat targets by firing fragmentation patterns forward and radially, based on computer calculated settings from the laser range-finder and other inputs. Targets are helicopters and dug in or defilade priority ground threats, such as ATGM positions. Rate of fire is 4 rd/min.

The 12.7-mm MG NSVT has both remote electronically operated sight PZU-5 and gun-mounted K10-T reflex sight.

The original night sight is the II Buran-PA (800-1300 meters range). The sight cannot be used to launch the ATGM. The daysight can be used at night for launching ATGMs if the target is illuminated. A variety of thermal sights is available. They include the Russian Agava-2, French SAGEM-produced ALIS and Namut sight from Peleng. There are thermal sights available for installation which permit night launch of ATGMs.

Chinese Main Battle Tank Type 59-II

	<p>Weapons & Ammunition Types</p> <p>105-mm rifled gun L7 New CH APFSDS-T M456 HEAT L35 HESH</p> <p>7.62-mm coax MG 7.62-mm bow MG 12.7-mm AA MG</p>	<p>Typical Combat Load</p> <p>34 12 6 16</p> <p>2,000 1,000 500</p>
<p>SYSTEM Alternative Designations: WZ 120B Date of Introduction: 1951 Proliferation: At least 2 countries Description: Crew: 4 Combat Weight (mt): 36.5-37.0 Chassis Length Overall (m): 6.04 Height Overall (m): 2.59 Width Overall (m): 3.30 Ground Pressure (kg/cm²): 0.8</p> <p>Automotive Performance: Engine Type: 520-hp Diesel Cruising Range (km): 440/600 with external tanks Speed (km/h): Max Road: 50 Max Off-Road: 25 Average Cross-Country: INA Max Swim: N/A Fording Depths (m): 1.4 Unprepared, 5.5 with snorkel</p> <p>Radio: INA</p> <p>Protection: Armor, Turret Front (mm): 203 Applique Armor (mm): Track skirts are fitted to some tanks Explosive Reactive Armor (mm): N/A Active Protective System: N/A Mineclearing Equipment: Mine plows and roller-plows available Self-Entrenching Blade: N/A NBC Protection System: N/A Smoke Equipment: 8 x 81-mm smoke grenade launchers Vehicle engine exhaust smoke system</p> <p>ARMAMENT Main Armaments: Caliber, Type, Name: 105-mm rifled gun, similar to L7 Rate of Fire (rd/min): 6-10 Loader Type: Manual Ready/Stowed Rounds: INA Elevation (°): -5/+18 Fire on Move: Yes</p> <p>Auxiliary Weapon: Caliber, Type, Name: 7.62-mm (7.62x 54R) Machine gun Type 59T Mount Type: Turret coax Maximum Aimed Range (m): 2,000 Max Effective Range (m): Day: 1,000 Night: 800</p>	<p>Fire on Move: Yes Rate of Fire (rd/min): 250 practical, 600 cyclic in 2-10 round bursts</p> <p>Caliber, Type, Name: 7.62-mm (7.62x 54R) Machine gun Type 59T Mount Type: Bow ball mount Maximum Aimed Range (m): 1,000 Max Effective Range (m): Day: 1,000 Night: N/A Fire on Move: Yes Rate of Fire (rd/min): 250 practical, 600 cyclic in 2-10 round bursts</p> <p>Caliber, Type, Name: 12.7-mm (12.7x108) AA MG Type 54 Mount Type: Turret cupola Maximum Aimed Range (m): 2,000 Max Effective Range (m): Day: 1,500 ground/1,600 for air targets (APDS) Night: N/A, II sights available Fire on Move: Yes Rate of Fire (rd/min): 80-100 practical, 600 air targets 2-10 rd bursts</p> <p>FIRE CONTROL FCS Name: UI light spot fire control system Main Gun Stabilization: 2-plane Rangefinder: LRF Infrared Searchlight: Yes Sights w/Magnification: Gunner: Day: INA Field of View (°): INA Acquisition Range (m): INA Night: Type DC 1024/00 II sights, x7 Field of View (°): 6 Acquisition Range (m): 1,000 Commander Fire Main Gun: No</p> <p>VARIANTS: Type 59: Original model is a copy of the Former Soviet T-54 MBT and has a 100-mm main gun.</p> <p>T-72Z/ Safir 74: Iranian variant which constitutes state of the art for upgraded 50s-generation former Warsaw Pact tanks. This tank has a 780-hp diesel engine, track skirts, and smoke grenade launchers. An Iranian ERA package will fit T-72Z. Armament includes an M68 105-mm rifled gun, 7.62-mm Type 59T (PKT) MG, and a 12.7-mm Type 59 (DShKM) MG. The cannon can launch AT-10/ Bastion ATGMs (to 4000 meters) and fire a broad range of NATO 105-mm ammunition. Fire control includes the robust Slovenian EFCS-3-55 fire control system with stabilization, a laser rangefinder, and a ballistic computer. The FCS includes a commander's independent viewer and target designation system, and II gunner night sights.</p>	

Chinese Main Battle Tank Type 59-II continued

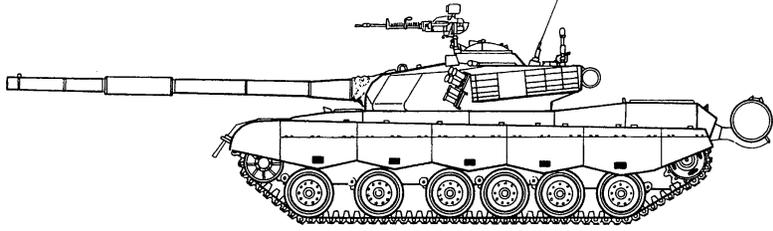
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<p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 105-mm APFSDS, H6/62 Maximum Aimed Range (m): 3,000 Max Effective Range (m): Day: 2,000-3,000 (est) Night: 800-1,300 Armor Penetration (mm): INA</p> <p>105-mm APFSDS, UI (New Chinese) Maximum Aimed Range (m): 3,000 Max Effective Range (m): Day: 2,000-3,000 (est) Night: 800-1,300 Armor Penetration (mm): 460 at 2,000 m</p>	<p>105-mm HEAT, M456 (multinational) Maximum Aimed Range (m): 3,000 Max Effective Range (m): Day: 1,500-2,500 (est) Night: 800-1,300 Armor Penetration (mm): 432, NATO single heavy target</p> <p>105-mm HESH, L35 (UK) Maximum Aimed Range (m): 5,000 Max Effective Range (m): Day: 2,000-3,000 (est) Night: 800-1,300 Armor Penetration (mm): NATO single heavy target</p> <p>Other Ammunition Types: Chinese Type 83/ UK L64/ US M735 APFSDS, UK L52 APDS, multinational M393 HEP-T, French OE 105-F1 HE, L39 Smoke, cannister</p>
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NOTES

GEC-Marconi Centaur fire control system is available. British Barr and Stroud thermal based FCS can be fitted.

Chinese Main Battle Tank Type 85-IIM

	<p>Weapons & Ammunition Types</p> <p>125-mm smoothbore gun APFSDS-T HEAT Frag-HE</p> <p>7.62-mm coax MG</p> <p>12.7-mm cupola AAMG</p>	<p>Typical Combat Load</p> <p>42 (mix est) 15 6 21</p> <p>2,000</p> <p>500</p>
<p>SYSTEM Alternative Designations: INA Date of Introduction: 1991 Proliferation: At least 2 countries Description: Crew: 3 Combat Weight (mt): 41.0 Chassis Length Overall (m): 10.28 Height Overall (m): 2.30 Width Overall (m): 3.450 Ground Pressure (kg/cm²): 0.771</p> <p>Automotive Performance: Engine Type: 730-hp Diesel Cruising Range (km): 700/900 with external tanks Speed (km/h): Max Road: 57 Max Off-Road: 45 Average Cross-Country: 35 Max Swim: N/A Fording Depths (m): 1.4 Unprepared, 2.4 with snorkel</p> <p>Radio: INA</p> <p>Protection: Armor, Turret Front (mm): INA Applique Armor (mm): Track skirts. Composite panels available. Explosive Reactive Armor (mm): N/A Active Protective System: N/A Mineclearing Equipment: Mine plows and roller-plov set Self-Entrenching Blade: N/A NBC Protection System: Yes Smoke Equipment: 12x 81-mm smoke grenade launchers Vehicle engine exhaust smoke system</p> <p>ARMAMENT Main Armament: Caliber, Type, Name: 125-mm smoothbore gun 2A46M/ D-81TM Rate of Fire (rd/min): 4-6/2 in manual mode Loader Type: Autoloader (separate loading) and manual Ready/Stowed Rounds: 22/23 (22 in carousel) Elevation (°): -6 to +14 Fire on Move: Yes, up to 25 km/h. Depending on the road and distance to the target, most crews may halt before firing.</p> <p>Auxiliary Weapon: Caliber, Type, Name: 7.62-mm (7.62x 54R) Machine gun Type 59 Mount Type: Turret coax Maximum Aimed Range (m): 1,800 Max Effective Range (m): Day: 1,000</p>	<p>Night: 800 Fire on Move: Yes Rate of Fire (rd/min): 250 practical, 600 cyclic, 2-10 rd bursts</p> <p>Caliber, Type, Name: 12.7-mm (12.7x108) AA MG Type 54 Mount Type: Cupola Maximum Aimed Range (m): 2,000 Max Effective Range (m): Day: 1,500 ground/1600 for air targets (APDS) Night: N/A Fire on Move: Yes Rate of Fire (rd/min): 80-100 practical, 600 air targets, 2-10 rd bursts</p> <p>FIRE CONTROL FCS Name: ISFCS-212 (Image-Stabilized Fire Control System) Main Gun Stabilization: 2-plane Rangefinder: LRF Infrared Searchlight: Yes Sights w/Magnification: Gunner: Day: UI stabilized gunner sight Field of View (°): INA Acquisition Range (m): INA Night: 2nd Generation II sights Field of View (°): INA Acquisition Range (m): INA Commander Fire Main Gun: No</p> <p>VARIANTS Type 85-IIAP: Variant assembled from Type 59s and Type 69-IIs and upgrade kits, or from licensed production in Pakistan.</p> <p>Type 85-III: Upgraded variant with 1,000-hp engine and composite armor panels. Variant is in prototype stage.</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 125-mm APFSDS-T, BM-42M Maximum Aimed Range (m): 3,000 Max Effective Range (m): Day: 2,000-3,000 Night: 850-1,300 Armor Penetration (mm): 590-630 at 2,000 meters</p> <p>125-mm Frag-HE-T, OF-26 Maximum Aimed Range (m): 5,000 Max Effective Range (m): Day: INA Night: 850-1,300 Armor Penetration (mm): INA</p>	

Chinese Main Battle Tank Type 85-IIM continued

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<p>125-mm HEAT-MP, BK-29M Maximum Aimed Range (m): 3,000 Max Effective Range (m): Day: INA Night: 850-1300 Armor Penetration (mm): 650-750</p> <p>125-mm HEAT, BK-27 Maximum Aimed Range (m): 3,000 Max Effective Range (m): Day: INA Night: 850-1,300 Armor Penetration (mm): 700-800</p>	<p>Other Ammunition Types: Giat 125G1 APFSDS-T, Russian BM-42 and BM-32 APFSDS-T. Note: The Russians may have a version of the BM-42M with a DU penetrator.</p>
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NOTES

GEC-Marconi Centaur fire control system is available. British Barr and Stroud thermal based FCS can be fitted.

The more recent BK-27 HEAT round offers a triple-shaped charge warhead and increased penetration against conventional armors and ERA. The BK-29 round, with a hard penetrator in the nose is designed for use against reactive armor, and as an MP round has fragmentation effects. If the BK-29 HEAT-MP is used, it may substitute for Frag-HE (as with NATO countries) or complement Frag-HE. With three round natures (APFSDS-T, HEAT-MP, ATGMs) in the autoloader vs four, more antitank rounds would be available for the higher rate of fire.

Chapter 5

Antitank

As armored combat vehicles have ascended in importance on the battlefield, so have the systems designed to stop those vehicles. The umbrella term *antitank* originally denoted systems specifically designed to destroy tanks. But today it is also more broadly constructed. Modern combat is combined arms combat. Mechanized forces include other armored combat vehicles, such as armored reconnaissance vehicles, infantry fighting vehicles, armored personnel carriers, etc. Tanks cannot survive or achieve their tactical objectives without support from other armored systems. The more recent term *antiarmor* may supplant the current term; because antitank weapons which cannot penetrate tank armor can still be a formidable threat if they can defeat or damage more lightly armored fighting vehicles. With upgrades and innovative tactics even older, seemingly obsolete, weapons can be used as OPFOR antiarmor weapons.

Antitank weapons can include guns of various sizes, antitank guided missile launcher systems, rocket and grenade launchers, mines and their delivery systems, and other obstacle systems. The rocket and grenade launchers are described in Chapter 1, Infantry Weapons. Mines and other obstacle systems are noted at Chapter 8, Engineer Systems. Because the OPFOR place a high priority on stopping and destroying armored combat vehicles, they will use all other available assets which can doctrinally support the effort. These include fixed and rotary-wing aircraft, artillery, NBC assets, etc. A number of recent systems have been fielded seemingly for other roles, but available for use as antitank weapons: light tanks, heavy armored reconnaissance vehicles with guns of 60 millimeters or more, assault vehicles, fire support vehicles, and artillery/mortar-type combination guns, such as Russian 120-mm 2S9, 2S23, and 2S31. Many OPFOR countries will employ antitank weapons for roles other than antitank, including AT guns against personnel and soft targets, and ATGMs against personnel and rotary-wing aircraft.

Antitank guns include towed guns and self-propelled antitank guns (also known as tank destroyers). A number of guns were designed as field guns, with multi-role capability as both artillery and antitank guns. The modern focus on maneuver warfare has brought a slight decline in development of uniquely antitank guns. Thus, the 85-mm D-44 gun, which can be used as artillery, is effective for use in an antitank role. Although recent systems have been developed, the number fielded has not kept pace with production of armored combat vehicles. Nevertheless, their effectiveness and selected armies' continued reliance on linear positional battles and protracted defenses have kept a large number of these systems in inventories. Based on numbers fielded and likelihood of their threat to US forces, only towed antitank guns were included.

A number of upgrades are available. These include night sights, such as passive image intensifier sights and thermal sights for the Russian 100-mm MT-12. This is a robust antitank weapon, with a high rate of fire and rapid mobility. Note the Russian innovation in the MT-12R, an AT gun with a radar-directed all-weather fire control system. Improved ammunition is critical for continued effectiveness of antitank weapons. The MT-12 and its variants can fire a variety of modern ammunition, including the Russian gun-launched ATGM, Kastet.

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The *antitank guided missile* (ATGM) is the singular greatest threat to tanks today. These systems are distinguished from other antitank weapons in that they are guided to the target. Most employ SACLOS guidance (see Glossary). An operator holds crosshairs on the target, and the missile tracker directs the missile to that point. There is a wide variety of countermeasures (such as smoke and counterfire, due to long flight time and operator vulnerability) for use against ATGMs. Thus, a 90% probability of hit is a technical figure, and does not mean a 90% probability of success. On the other hand, there is a variety of counter-countermeasures which the ATGMs, launchers, and operators can use to increase the chance for success. Tactics, techniques and procedures within the antitank arena are critical to mission success.

As armor protection levels and antitank weapon lethality levels continue to rise, armor protection for many modern tanks has outpaced most AT weapons. However, ATGMs have been able to increase their size, range, and warhead configurations to threaten even the heaviest tanks. Among notable trends in ATGMs is the worldwide proliferation and variety of manportable and portable *antitank guided missile launchers*. These include shoulder-launched, short-range systems, such as the French Eryx, and a variety of copies of former Soviet systems, such as the AT-3/Malyutka ("Suitcase SAGGER). Another notable trend is in development of upgrade ATGMs, with increased lethality. The most common type of lethality upgrade is addition of a nose precursor or tandem warhead. A more recent lethality upgrade has been the use of warheads that permit the "fly-over, shoot-down" mode. These missiles can over-fly a vehicle behind a hill, and fire an explosively-formed penetrator (EFP, in the shape of a cannon kinetic-energy penetrator round) downward through the relatively soft top of armored vehicles. Other improvements include improved guidance and resistance to countermeasures, reduced smoke and noise signature, and increased range. A fairly common trend has been addition of night sights, including thermal sights for the launcher. As the missiles and launchers have been improved, weight loads have increased. Most of the so-called portable launchers (AT-4 launcher, TOW, and HOT) have outgrown the portability weight limit, and must be carried in vehicles and only dismounted short distances from the carriers.

Although there are unique *ATGM launcher vehicles* with unique ATGMs, most numerous launcher vehicles are military and commercial vehicles adapted with pintel mounts for portable ground launchers, with ATGMs manually loaded and launched. Configurations of those vehicles consist of simply pairing of vehicle and launcher, and can be executed with equipment at hand; therefore, they were not described in this guide. The number of fielded ATGM launcher vehicles specially designed for the mission numbers no more than a few dozen systems. They constitute a high level threat to vehicles and rotary-winged aircraft in the US Army.

Systems selected for this chapter are the more common threat systems, or represent the spectrum of antitank systems which can threaten US Army forces in the world today.

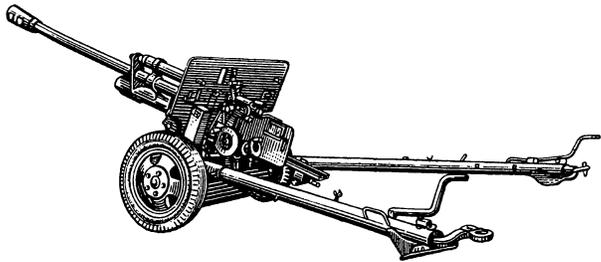
Questions and comments on data listed in this chapter should be addressed to:

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Russian 76-mm Towed Antitank Gun ZIS-3

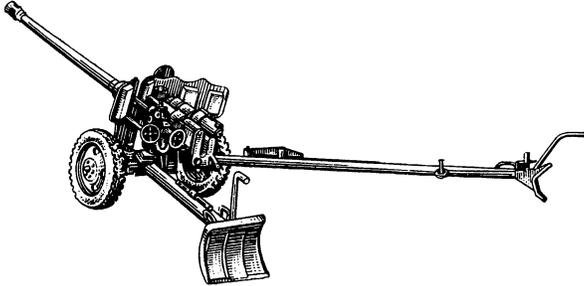
	<p>Weapons & Ammunition Types</p> <p>76-mm rifled gun HVAP-T HEAT APC-T Frag-HE</p>	<p>Typical Combat Load</p> <p>INA</p>
<p>SYSTEM Alternative Designations: M1942 Date of Introduction: INA Proliferation: At least 14 countries</p> <p>Description: Crew: 5-7 Combat Weight (mt): 1.12 Length Overall, Travel (m): 6.10 Height Overall, Travel (m): 1.3 Width Overall, Travel (m): 1.4</p> <p>Mobility: Mount: Two-wheeled carriage with twin trails Prime mover: AT-P tractor, light trucks Towed Speed (km/h): Max Road: INA Max Off-Road: INA Average Cross-Country: INA Fording Depth (m): N/A Emplace Time (min): INA Displace Time (min): INA Radio: N/A Protection: Gun shield</p> <p>ARMAMENT Main Armaments: Caliber, Type, Name: 76-mm rifled gun Rate of Fire (rd/min): 8-10 normal / 15-20 burst indirect fire Loader Type: Manual Ready/Stowed Rounds: N/A Elevation (°): -5/+37 Fire on Move: No</p> <p>FIRE CONTROL FCS Name: N/A Main Gun Stabilization: N/A Rangefinder: N/A Sights w/Magnification: Gunner: Day: INA Field of View (°): INA Acquisition Range (m): INA Night: INA Field of View (°): INA Acquisition Range (m): INA</p>	<p>VARIANTS N/A</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 76-mm HVAP-T, BR-354P Maximum Aimed Range (m): INA Max Effective Range (m): Day: 1,000 Night: INA Armor Penetration (mm): 58 at 1,000 meters 92 at 500 meters</p> <p>76-mm APC-T , BR-350B Maximum Aimed Range (m): INA Max Effective Range (m): INA Day: 1,000 Night: INA Armor Penetration (mm): 61 at 1,000 meters</p> <p>76-mm HEAT, BK-354M Maximum Aimed Range (m): 1,000 Max Effective Range (m): INA Day: 500 Night: INA Armor Penetration (mm): 120 (RHA)</p> <p>76-mm Frag-HE, OF-350A Maximum Aimed Range (m): INA Max Effective Range (m): Day: INA Night: INA Armor Penetration (mm): INA</p> <p>76-mm Frag-HE Maximum Aimed Range (m): INA Max Effective Range (m): Day: 1,500 Night: INA Armor Penetration (mm): INA</p> <p>Other Ammunition Types: API-T BZR-350B, Smoke (WP)</p>	

NOTES

Although the ZIS-3 is categorized as an antitank gun, some OPFOR forces will employ it for general support, especially against light targets. Typical combat load is based on the prime mover; and a wide variety of systems can be used as prime movers.

Russian 85-mm Towed Gun D-44

Worldwide Equipment Guide

	<p>Weapons & Ammunition Types</p> <p>85-mm rifled gun</p> <p>HVAP-T HEAT-FS AP HE Frag-HE Smoke</p>	<p>Typical Combat Load</p> <p>21</p> <p>(est) 3 3 3 9 3</p>
	<p>SYSTEM Alternative Designations: M1945 Date of Introduction: 1944 Proliferation: At least 16 countries Description: Crew: 8 Combat Weight (mt): 3.1 Length Overall, Travel (m): 8.34 Height Overall, Travel (m): 1.42 Width Overall, Travel (m): 1.73</p> <p>Mobility: Mount: Two-wheeled carriage with twin trails and coaster wheel Prime mover: AT-P tractor, light trucks Towed Speed (km/h): Max Road: 60 Max Off-Road: 35 Average Cross-Country: INA Fording Depth (m): INA Emplace Time (min): 2 Displace Time (min): 2 Radio: N/A Protection: Gun shield</p> <p>ARMAMENT Main Armaments: Caliber, Type, Name: 85-mm rifled gun Rate of Fire (rd/min): 8 normal / 15 burst Indirect Fire Loader Type: Manual Ready/Stowed Rounds: 0 / 140 on prime mover Elevation (°): -7/+35 Fire on Move: No</p> <p>FIRE CONTROL FCS Name: N/A Main Gun Stabilization: N/A Rangefinder: N/A Sights w/Magnification: Gunner: Day: OP-2-7 Direct Fire, 5.5x / PG-1M Indirect Fire Field of View (°): INA Acquisition Range (m): 1,500 Night: INA Field of View (°): INA Acquisition Range (m): INA</p> <p>VARIANTS D-44-N: Variant with II night sight. SD-44: Airborne version with auxiliary propulsion unit which permits self-propulsion for short distances at speeds of up to 25 km/h on the road, 5.5 km/h off road.</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 85-mm HVAP-T, BR-365P/365PK Maximum Aimed Range (m): 1,500 Max Effective Range (m): Day: 1,150 Night: INA Armor Penetration (mm): 180 (RHA) at 1,000 meters 113 (RHA, 30°) at 500 meters</p> <p>85-mm HEAT-FS, BK-2M Maximum Aimed Range (m): 1,500 Max Effective Range (m): Day: 1,500 Night: INA Armor Penetration (mm): 300</p> <p>85-mm AP HE Maximum Aimed Range (m): 1,500 Max Effective Range (m): Day: 950 Night: INA Armor Penetration (mm): 91 (30° angle) at 500 meters</p> <p>85-mm Frag-HE, O-365K Maximum Aimed Range (m): 1,500 Max Effective Range (m): Day: 1,500 Night: INA Armor Penetration (mm): INA</p> <p>Other Ammunition Types: HE, BR-365 and -365K AP-T and APC-T (obsolete)</p>	

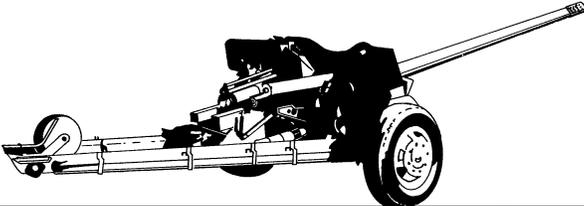
NOTES

The gun is variously referred to as artillery, as a field gun or as an antitank gun. It can be used for all roles or specifically for artillery or antitank.

Typical combat load is based on the prime mover; and a wide variety of systems can be used as prime movers.

PG-1M indirect fire sight characteristics are: 4x, 10° field of view. The PG-1 and -M can be used to a limited extent as direct fire sights.

Russian 100-mm Towed Antitank Gun MT-12

	<p>Weapons & Ammunition Types</p> <p>100-mm smoothbore gun</p> <p>APFSDS-T HEAT Frag-HE AT-10 ATGM</p>	<p>Typical Combat Load</p> <p>20</p> <p>8 4 4 4</p>
<p>SYSTEM Alternative Designations: T-12A, 2A29 Date of Introduction: 1972 Proliferation: At least 12 countries Description: Crew: 6 Combat Weight (mt): 3.1 Length Overall, Travel (m): 9.65 Height Overall, Travel (m): 1.6 Width Overall, Travel (m): 2.3</p> <p>Automotive Performance: Mount: Two-wheeled carriage with twin trails and coaster wheel Prime mover: MT-LB-T, URAL-375D and other trucks Towed Speed (km/h): Max Road: 60 Max Off-Road: INA Average Cross-Country: 25 Fording Depth (m): INA Emplace Time (min): 2-3 Displace Time (min): 2-3 Radio: N/A Protection: Gun shield</p> <p>ARMAMENT Main Armaments: Caliber, Type, Name: 100-mm smoothbore gun 2A29 Rate of Fire (rd/min): 6-8/up to 15 indirect fire Loader Type: Manual Ready/Stowed Rounds: 0/20 Elevation (°): -7/+20 Fire on Move: No</p> <p>ATGM Launcher: Launch Method: Gun-launched, 2A29 smoothbore gun Guidance: Laser-beam rider Command Link: Encoded laser-beam Launcher Dismountable: No</p> <p>FIRE CONTROL FCS Name: N/A Main Gun Stabilization: N/A Rangefinder: N/A Sights w/Magnification: Gunner: Day: OP40M-40U direct fire, 5.5x / PG-1M indirect fire Field of View (°): 11 Acquisition Range (m): 3,000/8,200 indirect fire Night: APN6-40 II sight, 6.8x</p>	<p>Field of View (°): 7 Acquisition Range (m): 2,000</p> <p>VARIANTS T-12: Original version of Russian gun. MT-12 has changes in carriage and obturator, which do not affect lethality performance. MT-12R: Russian upgrade with radar-directed fire control system, for use at night and adverse weather. Topaz: Former-Yugoslav variant of T-12, with the 2A19M gun mounted on a D-30 carriage. Some have AT FCS-1 (see NOTE).</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 100-mm APFSDS-T, BM-412M, Romanian Maximum Aimed Range (m): 2,500, 3,000 platoon volley Max Effective Range (m): Day: INA Night: INA Armor Penetration (mm): 418 at 2,000 m/380 at 3,000 m</p> <p>100-mm APFSDS-T, M1000, Belgian Maximum Aimed Range (m): 3,000/platoon volley INA Max Effective Range (m): Day: INA Night: INA Armor Penetration(mm): Triple heavy target at 4,000 meters</p> <p>100-mm HEAT, BK-17 Maximum Aimed Range (m): 2,500, 3,000 platoon volley Max Effective Range (m): Day: INA Night: INA Armor Penetration (mm): 380</p> <p>Other Ammunition Types: Russian BM-2/-20/-25 APFSDS-T; OF-15 Frag-HE; BK-5M HEAT-FS</p> <p>Antitank Guided Missiles: Name: AT-10/Kastet Warhead Type: Shaped charge (HEAT) Armor Penetration (mm): 650 (RHA) Range (m): 5,000</p> <p>Name: AT-10b/Kan Warhead Type: Tandem Shaped charge (HEAT) Armor Penetration (mm): 700 (RHA) behind ERA Range (m): 5,000</p>	

NOTES

Russian 2nd generation II sights are available. The daysight can be used at night if the target is illuminated. Thermal sights are available. The MT-12R radar FCS can be used for surveillance, acquisition, and tracking. The Serb Iskra AT FCS-1 computerized laser rangefinder FCS is on offer for sale. Range is 500-3,000 meters. The ATGM sight and laser guidance device has a 5,000-meter range and is a day sight only. Ranges (m) for Frag-HE: 8,200 indirect fire/3,000 direct-fire. Rate of fire for indirect fire (Frag-HE) is up to 15 rd/min.

Russian ATGM Launcher Vehicle 9P148

		<p>Weapons & Ammunition Types</p> <p>Launcher AT-5/AT-5B ATGM</p> <p>Mixed (see NOTES) AT-4/AT-4B ATGM AT-5/AT-5B ATGM</p>	<p>Typical Combat Load</p> <p>15-20 15</p> <p>10 10</p>
<p>SYSTEM Alternative Designations: BRDM-2/AT-5 Date of Introduction: 1977 Proliferation: At least 6 countries Description: Crew: 2 Platform: BRDM-2M/GAZ-41-08 Combat Weight (mt): 7.0 Chassis Length Overall (m): 5.73 Height (m): Overall: 2.31 In Firing Position: INA Width Overall (m): 2.26 Drive Formula: 4 x 4 (+ 4 auxiliary wheels)</p> <p>Automotive Performance: Engine Type: 140-hp Gasoline Cruising Range (km): 750 Speed (km/h): Max Road: 100 Max Off-Road: INA Average Cross-Country: INA Max Swim: 10 Fording Depth (m): Amphibious Self-Entrenching Blade: N/A</p> <p>Radio: R-123</p> <p>Protection: Armor, Turret Front (mm): 10 Applique Armor (mm): N/A Explosive Reactive Armor (mm): N/A Active Protective System: N/A NBC Protection System: Collective Smoke Equipment: N/A</p> <p>ARMAMENT Antitank Guided Missile Launcher Name: 9P135M3 (recent upgrade) Launch Method: tube-launched Number of missiles on launcher: 5 Elevation (°): INA Rate of Launch: (missiles/min): 2-3, depending on range Reaction Time (sec): INA Emplacement Time (min): INA Displacement Time (min): INA Can Launch Missiles Simultaneously: NA Ready/Stowed Missiles: 15 (launcher + autoloader)/ 0-5 by mix Loader Type: Automated Launcher dismountable: No Auxiliary Launcher: Yes Fire on the Move: No</p>	<p>FIRE CONTROL FCS Name: N/A Guidance: SACLOS Command Link: Wire Beacon Type: Incandescent bulb Tracker Type: IR, 9S451M1 Susceptible To Countermeasures: EO jammers, smoke, counterfire Counter-countermeasures: Electro-optical jamming alarm (See note) Rangefinder: N/A Infrared Searchlight: N/A Sights w/Magnification: Gunner: Day: 9Sh119M1 Field of View (°): INA Acquisition Range (m): INA Night: 1PN65 Field of View (°): INA Acquisition Range (m): 2,500</p> <p>VARIANTS 9P137: Original launcher vehicle with 5 AT-5 (only) launch rails</p> <p>AMMUNITION Antitank Guided Missiles: Name: AT-5/SPANDREL Alternative Designations: Konkurs Missile Weight (kg): 25.2 (in tube) Warhead Type: Shaped Charge (HEAT) Armor Penetration (mm): 650 Minimum/Maximum Range (m): 75/4,000 Probability of Hit (%): 90 Average Velocity (m/s): 200 Time of Flight to Max Range (sec): 20</p> <p>Name: AT-5B Alternative Designations: Konkurs-M Missile Weight (kg): 26.5 (in tube) Warhead Type: Tandem Shaped Charge (HEAT) Armor Penetration (mm): 925 Minimum/Maximum Range (m): 75/4,000 Probability of Hit (%): 90 Average Velocity (m/s): 208 Time of Flight to Max Range (sec): 19</p> <p>Name: AT-4/SPIGOT Alternative Designations: Fagot Missile Weight (kg): 13.0 (in tube) Warhead Type: Shaped Charge (HEAT) Armor Penetration (mm): 480 Minimum/Maximum Range (m): 70/2,000 Probability of Hit (%): 90 Average Velocity (m/s): 186 Time of Flight to Max Range (sec): 11</p>		

Russian ATGM Launcher Vehicle 9P148 continued

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Name: AT-4B Alternative Designations: Factoria, Konkurs M Missile Weight (kg): 13.4 (in tube) Warhead Type: Shaped Charge (HEAT) Armor Penetration (mm): 550 Minimum/Maximum Range (m): 70/2,500 Probability of Hit (%): 90 Average Velocity (m/s): 180 Time of Flight to Max Range (sec): 13.2-14.0	Other Missile Types: N/A
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NOTES

A variety of ATGM mixes have been seen with 9P148, between AT-4 and AT-5-type ATGMS. The primary benefit of adaptability is increased launcher load and adaptability to user countries' inventories of ATGMS. Most common ATGM is AT-5. As AT-5B is produced, it is likely to replace AT-5 in better-budgeted country inventories.

Reload time for the launcher is 25 seconds.

Russian firms have developed countermeasures, such as encoded-pulse beacons for ATGMS and counter-dazzler adjustments to the 9S451M1 guidance box. Filters can be mounted in front of reticles.

The 1PN66 thermal sight is available for the ATGM launcher. Acquisition range is approximately 2,500 meters.

Russian KBP offers a drop-in one-man turret, called Kliver, with a stabilized 2A72 30-mm gun, a 4 Kornet ATGM launcher, thermal sights, and improved fire control system.

Russian ATGM Launcher Vehicle 9P149

	<p>Weapons & Ammunition Types</p> <p>Launcher AT-6 HEAT ATGM AT-9 HEAT ATGM AT-6 HE ATGM AT-9 HE ATGM</p>	<p>Typical Combat Load</p> <p>12</p>
<p>SYSTEM Alternative Designations: Shturm-S Date of Introduction: 1990 Proliferation: At least 9 countries Description: Crew: 2 Platform: MT-LB Combat Weight (mt): 12.3 Chassis Length Overall (m): 6.35 Height (m): Overall: 1.8 In Firing Position: INA Width Overall (m): 2.85</p> <p>Automotive Performance: Engine Type: 290-hp Diesel Cruising Range (km): 500 km Speed (km/h): Max Road: 65 Max Off-Road: INA Average Cross-Country: INA Max Swim: 3-4 Fording Depths (m): Amphibious Self-Entrenching Blade: Yes</p> <p>Radio: R-123M or R-173</p> <p>Protection: Armor, Turret Front (mm): 7-14 Applique Armor (mm): N/A Explosive Reactive Armor (mm): N/A Active Protective System: N/A NBC Protection System: Collective Smoke Equipment: N/A</p> <p>ARMAMENT Antitank Guided Missile Launcher Name: INA Launch Method: tube-launched Number of missiles on launcher: 1 Elevation (°): -5/+15 Rate of Launch: (missiles/min): 2-3, depending on range Reaction Time (sec): INA Emplacement Time (min): INA Displacement Time (min): INA Can Launch Missiles Simultaneously: N/A Ready/Stowed Missiles: 12/ 0 Loader Type: Automated</p>	<p>Launcher dismountable: No Auxiliary Launcher: No Fire on the Move: No</p> <p>FIRE CONTROL FCS Name: INA Guidance: SACLOS Command Link: Radio frequency Beacon Type: INA Tracker Type: IR Susceptible To Countermeasures: Smoke, counterfire Counter-countermeasures: 5 encoded frequencies Rangefinder: INA Infrared Searchlight: INA Sights w/Magnification: Gunner: Day: INA Field of View (°): INA Acquisition Range (m): 5,000 Night: Yes Field of View (°): INA Acquisition Range (m): INA</p> <p>VARIANTS N/A</p> <p>AMMUNITION Antitank Guided Missiles Name: AT-6a/SPIRAL Alternative Designations: Kokon Missile Weight (kg): 46.5 (in tube) Warhead Type: Shaped Charge (HEAT) Armor Penetration (mm): 750, 600 behind ERA Minimum/ Maximum Range (m): 400/5,000 Probability of Hit (%): 90 Average Velocity (m/s): 345 Time of Flight to Max Range (sec): 14.5</p> <p>Name: AT-9 Alternative Designations: Ataka Missile Weight (kg): 48.3 (in tube) Warhead Type: Tandem Shaped Charge (HEAT) Armor Penetration (mm): 950, 800 behind ERA Minimum/Maximum Range (m): 400/6,000, 5,000 ground use Probability of Hit (%): 90 Average Velocity (m/s): 400 Time of Flight to Max Range (sec): 15.0 (12.5 in ground use)</p> <p>Other Missile Types: AT-6 HE thermobaric, AT-9 HE thermobaric</p>	

NOTES

Other missiles (AT-6b and AT-6c) can be launched from helicopters; but their length exceeds the 1832-mm limit for the Shturm-S autoloader. A modular AT-6 ATGM launcher system with launcher and autoloader is available for installation on vehicles, fixed sites and boats.

French ATGM Launcher Vehicle AMX-10 HOT

		<p>Weapons & Ammunition Types</p> <p style="text-align: center;">Total</p> <p>HOT/ HOT 2, 2T/ HOT 3</p>	<p>Typical Combat load</p> <p style="text-align: center;">18</p>
	<p>SYSTEM Alternative Designations: INA Date of Introduction: INA Proliferation: At least 1 country Description: Crew: 4-5 Platform: AMX-10P Combat Weight (mt): 14.1 Chassis Length Overall (m): 5.78 Height (m): Overall: 2.57 In Firing Position: INA Width Overall (m): 2.78</p> <p>Automotive Performance: Engine Type: 300-hp Diesel Cruising Range (km): 600 km Speed (km/h): Max Road: 65 Max Off-Road: INA Average Cross-Country: 30-40 Max Swim: 7 (with optional water jets) Fording Depths (m): Amphibious Self-Entrenching Blade: N/A</p> <p>Radio: VHF and intercom</p> <p>Protection: Armor, Turret Front (mm): 12.7-mm frontal (distance NFI) Applique Armor (mm): N/A Explosive Reactive Armor (mm): Available (see NOTES) Active Protective System: N/A NBC Protection System: Collective Smoke Equipment: 3 smoke grenade launchers</p> <p>ARMAMENT Antitank Guided Missile Launcher Name: Lancelot 3 Launch Method: tube-launched Number of missiles on launcher: 4 Elevation (°): -12/+18 Rate of Launch: (missiles/min): INA Reaction Time (sec): INA Emplacement Time (min): INA Displacement Time (min): INA Can Launch Missiles Simultaneously : INA Ready/Stowed Missiles: 4/14 Loader Type: Manual Launcher dismountable: No Auxiliary Launcher: No Fire on the Move: No</p>	<p>FIRE CONTROL FCS Name: INA Guidance: SACLOS Command Link: Wire Beacon Type: INA Tracker Type: INA Susceptible To Countermeasures: Smoke, counterfire Counter-countermeasures: Infrared CM hardening on later ATGMs Rangefinder: M427 Laser rangefinder Infrared Searchlight: INA Sights w/Magnification: Gunner: Day: M509, 3x/12x Field of View (°): INA Acquisition Range (m): INA Night: Castor Thermal Image System available Field of View (°): INA Acquisition Range (m): INA</p> <p>VARIANTS N/A</p> <p>Antitank Guided Missiles Name: HOT Alternative Designations: Euromissile Missile Weight (kg): 32 (in tube) Warhead Type: Shaped Charge (HEAT) Armor Penetration (mm): 800 Minimum/ Maximum Range (m): 75/4,000 Probability of Hit (%): INA Average Velocity (m/s): 233 Time of Flight to Max Range (sec): 17.3</p> <p>Name: HOT 2 Alternative Designations: INA Missile Weight (kg): 32 (in tube) Warhead Type: Tandem Shaped Charge (HEAT) Armor Penetration (mm): 900 Minimum/Maximum Range (m): 75/4,000 Probability of Hit (%): INA Average Velocity (m/s): 233 Time of Flight to Max Range (sec): 17.3</p> <p>Name: HOT 2T Alternative Designations: INA Missile Weight (kg): 32 (in tube) Warhead Type: Tandem shaped Charge (HEAT) Armor Penetration (mm): 1250 Minimum/Maximum Range (m): 75/4,000 Probability of Hit (%): INA Average Velocity (m/s): INA Time of Flight to Max Range (sec): INA</p> <p>Other Missile Types: HOT 3--similar to HOT 2T, but with improved countermeasures</p>	

French ATGM Launcher Vehicle AMX-10 HOT continued

Worldwide Equipment Guide

NOTES

The HOT Antitank guided missile is produced by a European consortium which includes France and Germany. It can be launched from a ground launcher, the same launcher mounted on a variety of vehicles, from infantry fighting vehicles and ATGM launcher vehicles, and from helicopters. The AMX-10 HOT constitutes a high-end application on that spectrum, and has not been widely proliferated.

The cruciform-based single-tube ground launcher system exceeds the weight limit for the portable class of ATGM launchers. An updated launcher for HOT-2T offers a Thermal Modular System night sight and a dual band tracker. Alternate mounts for the launcher include the ATLAS/Commando lightweight launcher (140 kg) mounted on the Spanish Santana (4 x 4 Land Rover light truck).

The Lancelot turret used on AMX-10 HOT can be mounted on other armored fighting vehicles.

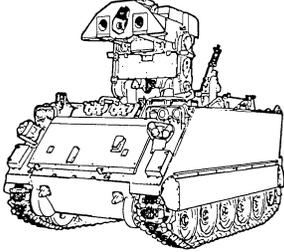
The French-produced VAB HOT uses a Mephisto retractable twin-tube launcher, and has an onboard load of 10 HOT ATGMs.

The UTM800 turret holds four HOT missiles, with a stabilized sight and Castor thermal night sight. The UTM800 is used on two applications. The French VCR/TH employs the turret on a Panhard VCR/TT 6 x 6 APC chassis. The other is the UTM turret on a VAB APC chassis.

The German Jaguar 1 Jagdpanzer is a modified Leopard 1 tank chassis with a single-tube HOT launcher.

French SNPE explosive reactive armor can be employed on AMX-10 type vehicles.

US ATGM Launcher Vehicle M901

	<p>Weapons & Ammunition Types</p> <p>ATGM Launcher TOW, ITOW, TOW 2, TOW 2A, TOW 2B</p> <p>7.62-mm Cupola MG</p>	<p>Typical Combat Load</p> <p style="text-align: center;">12</p> <p style="text-align: center;">2,000</p>
<p>SYSTEM Alternative Designations: ITV (Improved TOW Vehicle), ITOW Date of Introduction: 1978 Proliferation: At least 8 countries Description: Crew: 4-5 Platform: M113A1 Combat Weight (mt): 11.79 Chassis Length Overall (m): 4.90 Height (m): Overall: 2.91 In Firing Position: 3.35 Width Overall (m): 2.70</p> <p>Automotive Performance: Engine Type: 212-hp Diesel Cruising Range (km): 483 Speed (km/h): Max Road: 64 Max Off-Road: INA Average Cross-Country: INA Max Swim: 5.8 Fording Depths (m): Amphibious Self-Entrenching Blade: N/A</p> <p>Radio: Various, including intercom</p> <p>Protection: Armor, Turret Front (mm): INA Applique Armor (mm): Available. Anti-mine armor on bottom Explosive Reactive Armor (mm): Available Active Protective System: No NBC Protection System: No Smoke Equipment: 4 smoke grenade launchers on each front corner</p> <p>ARMAMENT Antitank Guided Missile Launcher Name: M27 cupola with launcher head ("Hammerhead") Launch Method: Tube-launched Number of missiles on launcher: 2 Elevation (°): -30/+34 Rate of Launch: (missiles/min): 2 Reaction Time (sec): 4.25 Emplacement Time (min): 0.33 Displacement Time (min): INA Can Launch Missiles Simultaneously : No Ready/Stowed Missiles: 2/10 Loader Type: Manual Launcher dismountable: No Auxiliary Launcher: No Fire on the Move: No</p>	<p>Auxiliary Weapon: Caliber, Type, Name: 7.62-mm (7.62x51) MG Mount Type: Cupola Direct Fire Range (m): INA Max Effective Range (m): Day: INA Night: INA Fire on Move: Yes Rate of Fire: INA</p> <p>Firing Ports: INA</p> <p>FIRE CONTROL FCS Name: INA Guidance: SACLOS Command Link: Wire Beacon Type: Xenon (Infrared), thermal on TOW-2 and after Tracker Type: INA Susceptible To Countermeasures: Smoke, counterfire Counter-countermeasures: Rangefinder: INA Infrared Searchlight: INA Sights w/Magnification: Gunner: Day: Day sight/tracker, 13x Field of View (°): 5.5 x Acquisition Range (m): INA Night: AN/TAS-4 thermal sight Field of View (°): INA Acquisition Range (m): INA</p> <p>VARIANTS ITOW: Launcher variants have been upgraded with new turrets and launcher heads to fit the later TOW variants, such as ITOW, TOW 2, 2A and 2B. M901A2: Launcher vehicle fitted for TOW 2.</p> <p>A variety of M113-based vehicles have incorporated TOW "hammerhead" launcher for use as ATGM launcher vehicles. These include the Italian VCC-1-based launcher vehicle, and the Dutch Armored Infantry Fighting Vehicle (AIFV) -based launcher vehicle.</p> <p>AMMUNITION Antitank Guided Missiles Name: TOW Alternative Designations: BGM-71 Missile Weight (kg): 25.5 (in tube) Warhead Type: Shaped Charge (HEAT) Armor Penetration (mm): 600 Minimum/ Maximum Range (m): 65/3,750 Probability of Hit (%): INA Average Velocity (m/s): 179 Time of Flight to Max Range (sec): 21</p>	

US ATGM Launcher Vehicle M901 continued

Worldwide Equipment Guide

<p>Name: ITOW Alternative Designations: BGM-71C Missile Weight (kg): 25.7 (in tube) Warhead Type: Tandem Shaped Charge (HEAT, short probe) Armor Penetration (mm): 800 Minimum/ Maximum Range (m): 65/3,750 Probability of Hit (%): INA Average Velocity (m/s): 179 Time of Flight to Max Range (sec): 21</p> <p>Name: TOW 2 Alternative Designations: BGM-71D Missile Weight (kg): 28.1 (in tube) / 21.5 (missile only) Warhead Type: Tandem Shaped Charge (Larger HEAT, long probe) Armor Penetration (mm): INA Minimum/ Maximum Range (m): 65/3,750 Probability of Hit (%): 90 Average Velocity (m/s): 179 Time of Flight to Max Range (sec): 21</p>	<p>Name: TOW 2A Alternative Designations: BGM-71E Missile Weight (kg): 22.65 (missile only) Warhead Type: Tandem Shaped Charge (Larger HEAT, long probe) Armor Penetration (mm): INA Minimum/ Maximum Range (m): 65/3,750 Probability of Hit (%): INA Average Velocity (m/s): 188 Time of Flight to Max Range (sec): 20</p> <p>Name: TOW 2B Alternative Designations: BGM-71F Missile Weight (kg): 22.60 (missile only) Warhead Type: Dual explosive-formed penetrators (EFP), top-attack Armor Penetration (mm): INA Minimum/ Maximum Range (m): 200/3,750 Probability of Hit (%): INA Average Velocity (m/s): 179 Time of Flight to Max Range (sec): 21</p> <p>Other Missile Types: See NOTES, below</p>
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NOTES

The loader has side and overhead protection during loading, which requires 40 seconds.

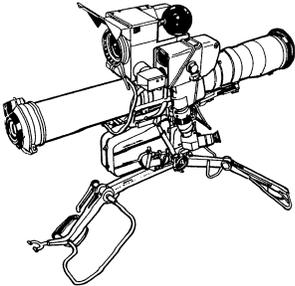
The Improved Target Acquisition System (ITAS) was developed for TOW 2 and later. It includes a laser rangefinder, increased acquisition range, improved night capabilities (second-generation thermal channel), an automatic boresight and greater hit probability.

The UK-developed Further-Improved TOW (FITOW) program is expected to be similar to TOW 2B, but with two smaller warheads.

The Israeli MAPATS is a TOW missile variant with laser-beam rider guidance and a laser guidance system.

The Israeli TAAS tandem warhead is the same diameter as the warhead on the original TOW missile, and appears to be a candidate for retrofit. The warhead is claimed to be able to penetrate 1,020 mm of armor.

Worldwide Equipment Guide

 <p style="text-align: center;">9P135M3 w/AT-5B and thermal sight</p>	<p>Weapons & Ammunition Types</p> <p>ATGM Launcher Total AT-4/AT-4B ATGM</p> <p>AT-5/AT-5B ATGM</p>	<p>Typical Combat Load</p> <p style="text-align: center;">4 or 8 (see NOTES)</p>
<p>SYSTEM Alternative Designations: 9P135M Firing Post, Fagot/Fagot-M Date of Introduction: 1973 Proliferation: At least 25 countries Description: Crew: 3 Primary Mount: Ground mount on folding tripod Alternate Mounts: Pintel (post) on BMP-1P, BTR-D, UAZ-469, etc. Weight Overall, Excluding Missile (kg): 22.5 Length Overall in Firing Position (m): 1.1/1.3 AT-4/5 tube Height Overall In Firing Position (m): INA Width Overall In Firing Position (m): INA</p> <p>ARMAMENT Launcher Name: 9P135 (AT-4 only), 9P135M (AT-4/AT-5), -M1, -M2, -M3 Launch Method: Tube-launched Elevation (°) (-/+): INA Rate of Launch: (missiles/min): 2-3, depending on range Reaction Time (sec): INA Emplacement Time (min): INA Displacement Time (min): INA Ready/Stowed Missiles: 4/0 full dismount, 4/4 on or near vehicle</p> <p>FIRE CONTROL FCS Name: 9S451M1 Guidance control box Guidance: SACLOS Command Link: Wire Beacon Type: Incandescent infrared bulb Tracker Type: IR, 9S451M1 Susceptible To Countermeasures: EO jammers, smoke, counterfire Counter-countermeasures: EO jamming alarm (see NOTES) Rangefinder: INA Sights w/Magnification: Gunner: Day: 9Sh119M1, 4x Field of View (°): 4.5 Acquisition Range (m): INA Night: Available (See NOTES)</p>	<p>VARIANTS P135M3: Konkurs-M Complex. Launcher with 1PN65 thermal sight and AT-5B/Konkurs-M missiles. Night range is 2,500m.</p> <p>AMMUNITION Antitank Guided Missiles Name: AT-5B/SPANDREL-B Alternative Designations: Konkurs-M Missile Weight (kg): 26.5 (in tube) Warhead Type: Tandem Shaped Charge (HEAT) Armor Penetration (mm): 925 Minimum/Maximum Range (m): 75/4,000 Probability of Hit (%): 90 Average Velocity (m/s): 208 Time of Flight to Max Range (sec): 19</p> <p>Name: AT-5/SPANDREL Alternative Designations: Konkurs Missile Weight (kg): 25.2 (in tube) Warhead Type: Shaped Charge (HEAT) Armor Penetration (mm): 650 Minimum/Maximum Range (m): 75/4,000 Probability of Hit (%): 90 Average Velocity (m/s): 200 Time of Flight to Max Range (sec): 20</p> <p>Name: AT-4/SPIGOT Alternative Designations: Fagot Missile Weight (kg): 13.0 (in tube) Warhead Type: Shaped Charge (HEAT) Armor Penetration (mm): 480 Minimum/Maximum Range (m): 70/2,000 Probability of Hit (%): 90 Average Velocity (m/s): 186 Time of Flight to Max Range (sec): 11</p> <p>Other Missiles: AT-4B/Factoria (see NOTES)</p>	

NOTES

Because of its weight, the Russians categorize the AT-4/4B system as portable (21-40 kg) rather than manportable. For dismounted carry load is divided among three packs. Due to the greater weight, AT-5/-5B fits into the "heavy" class (40+ kg), and should only be carried short distances from vehicles (<500 meters). For crews using both ATGM classes and operating near vehicles, combat load is 8 (4 stowed in the vehicle).

The AT-4B/Factoria is an upgrade ATGM with a 2,500 meter range, 550-mm penetration, and a velocity of 180 m/s (13.2 - 14.0 sec TOF). Russian firms have developed counter-countermeasures, such as encoded-pulse beacons for ATGMs and counter-dazzler adjustments to the 9S451M1 guidance box. Filters can be mounted in front of reticles.

TPVP/1PN65 thermal sight is available, with the range approximately 2,500 meters (see VARIANTS, above). Weight is 13 kg. Slovenian TS-F sight and Russian 1PN86-1/1PN86/Mulat have a 3,600 meter detection range.

Russian ATGM Launcher AT-7/AT-13

	<p>Weapons & Ammunition Types</p> <p>ATGM Launcher AT-7 HEAT ATGM AT-13 HEAT ATGM AT-13 HE ATGM</p>	<p>Typical Combat Load</p> <p>4</p>
<p>SYSTEM Alternative Designations: 9P151 Firing Post Date of Introduction: 1978 Proliferation: At least 5 countries</p> <p>Description: Crew: 2 Primary mount: Ground mount on tripod Alternate mounts: Shoulder for launch, UAZ-469 pintel mount Weight Overall, Excluding Missile (kg): 10.2 Length Overall in Firing Position (m): 0.78 with AT-7/Metis 0.98 with AT-13/Metis-M Height Overall In Firing Position (m): 0.72 with AT-7/Metis Width Overall In Firing Position (m): INA</p> <p>ARMAMENT Launcher Name: 9P151 Firing Post Launch Method: Tube Elevation (°): -5/+10 Rate of Launch (missiles/min): 3-5, depending on range Reaction Time (sec): INA Emplacement Time (min): 0.20 Displacement Time (min): 0.33 Ready/Stowed Missiles: 4/0 (1 on launcher)</p> <p>FIRE CONTROL FCS Name: 9S816 Guidance system Guidance: SACLOS Command Link: Wire Beacon Type: INA Tracker Type: IR Susceptible To Countermeasures: EO jammers, smoke, counterfire Counter-countermeasures: INA</p> <p>Rangefinder: Frequency: INA Counter-countermeasures: INA</p>	<p>Sights w/Magnification: Gunner: Day: INA Field of View (°): INA Acquisition Range (m): INA Night: Available</p> <p>VARIANTS Metis-M System: 9P151 firing post adapted for and including the Metis-M missile, IOC 1992.</p> <p>AMMUNITION Antitank Guided Missiles Name: AT-7/Saxhorn Alternative Designations: Metis Missile Weight (kg): 6.3 (in tube) Warhead Type: Shaped Charge (HEAT) Armor Penetration (mm): 460 Minimum/Maximum Range (m): 40/1,000 Probability of Hit (%): 90 Average Velocity (m/s): 180 Time of Flight to Max Range (sec): 6.2</p> <p>Name: AT-13 Alternative Designations: Metis-M (often mislabeled Metis-2) Missile Weight (kg): 13.8 (in tube) Warhead Type: Tandem Shaped Charge (HEAT) Armor Penetration (mm): 1,000/900 behind ERA Minimum/Maximum Range (m): 80/1500 Probability of Hit (%): 90 Average Velocity (m/s): 287 Time of Flight to Max Range (sec): 8</p> <p>Other missiles: Metis-M HE thermobaric</p>	

NOTES

The Russians characterize the AT-7 ATGM complex as light or manportable (5-20 kg), permitting long-distance carry by dismounted infantry. Although the AT-13 complex slightly exceeds 20 kg, it is close enough to fit into the category.

Guidance elevation has a 15° span. Because the module is small and can be quickly corrected by shifting, elevation and field of view are operationally unlimited, and permit use against hovering or stationary helicopters.

The Russian 1PN86V/Mulat-115 thermal sight is available for use on the launcher, with detection at 3,200 meters and recognition beyond the missile's 1,500 meter range. Field of view is 4.6°.

French ATGM Launcher Eryx

	<p>Weapons & Ammunition Types</p> <p>ATGM Launcher Eryx ATGM</p>	<p>Typical Combat Load</p> <p>1</p>
<p>SYSTEM Alternative Designations: Anti-Char Courtee Portee (ACCP) Date of Introduction: 1991 Proliferation: At least 5 countries Description: Crew: 1 Primary mount: Ground mount on tripod or shoulder launch Alternate mounts: Shoulder launch--standing, kneeling or prone Weight Overall, Excluding Missile (kg): 3, 4 with tripod Length Overall in Firing Position (m): 0.905 Height Overall In Firing Position (m): INA Width Overall In Firing Position (m): INA tripod, 0.16 on shoulder</p> <p>ARMAMENT Launcher Name: Eryx Launch Method: Tube (disposable canister/ launch tube) Elevation (°): INA, tripod; unlimited on shoulder launch Rate of Launch: (missiles/min): INA Reaction Time (sec): 20-30 (includes emplace time) Emplacement Time (min): See Reaction Time (above) Displacement Time (min): < 0.03 Ready/Stowed Missiles: 1/ 0</p> <p>FIRE CONTROL FCS Name: INA Guidance: SACLOS Command Link: Wire Beacon Type: Infrared laser diode Tracker Type: Charged couple device (CCD) Susceptible To Countermeasures: EO jammers, smoke, counterfire Counter-countermeasures: Flight time less than 4 seconds</p>	<p>Rangefinder: INA Sights w/Magnification: Gunner: Day: INA, 3x Field of View (°): 3.4 Acquisition Range (m): INA Night: Sopelem OB50 II sight Field of View (°): INA Acquisition Range (m): INA</p> <p>VARIANTS N/A</p> <p>AMMUNITION Antitank Guided Missile Name: Eryx Alternative Designations: ACCP Missile Weight (kg): 11 (in tube) Warhead Type: Tandem Shaped Charge (HEAT) Armor Penetration (mm): 900 Minimum/Maximum Range (m): 50/600 Probability of Hit (%): 90 Average Velocity (m/s): 162 Time of Flight to Max Range (sec): 3.7</p> <p>Other missiles: N/A</p>	

NOTES

The disposable canister/launch tube is attached to the reusable firing post (which includes sight systems).

Eryx employs a recoil reduction system with reduced back-blast, which permits launch from inside of buildings. Signature reduction includes noise and smoke reduction.

A rest such as a ledge or sandbag is required for launches beyond 350 meters.

The optional French Mirabel thermal night sight is available for use on Eryx. The Mirabel offers an acquisition range of 1,000 meters, but weighs an additional 3.4 kg.

Chapter 6 Artillery

This chapter provides the basic characteristics of selected artillery weapon systems either in use or readily available to the OPFOR. Therefore, the artillery systems discussed in this chapter are those likely to be encountered by U.S. forces in varying levels of conflict. The selection of artillery systems is not intended to be all-inclusive, rather a representative sampling of weapons and equipment supporting various military capabilities.

This chapter is divided into the following categories—artillery reconnaissance, towed artillery systems, self-propelled artillery systems, and multiple rocket launchers. Later updates of this guide will include data sheets addressing the aforementioned categories as well as mortars, artillery locating radars, sound and flash systems, and surface to surface missiles (SSMs).

OPFOR artillery units begin a battle with a full complement of ammunition to include special types of ammunition. The number and type of rounds vary according to the tactical situation and mission. Therefore, we have used frag-HE, smoke, and illumination as the default rounds to represent a typical combat load. Generally, the Typical Combat Load section represents the number and type of rounds carried on the self-propelled artillery system or rocket launcher. The numbers of rounds for the towed artillery systems vary according to the cargo capacity of the prime mover.

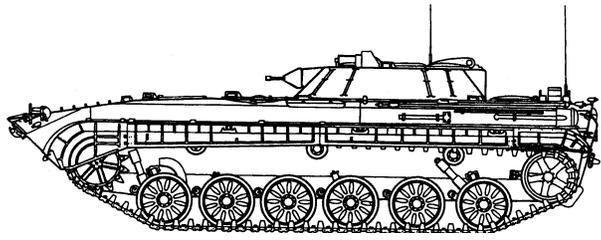
Questions and comments on data listed in this chapter should be addressed to:

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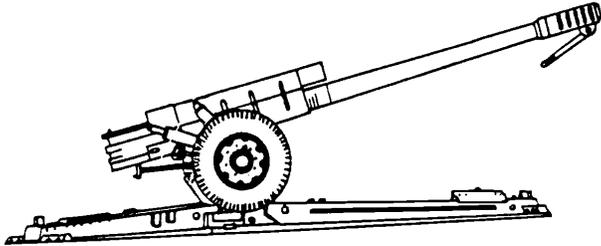
Russian Artillery Mobile Reconnaissance Vehicle PRP-3/PRP-4M

	<p>Weapons & Ammunition Types</p> <p>7.62 PKT MG</p>	<p>Typical Combat Load</p> <p>2,000</p>
<p>SYSTEM Alternative Designations: None Date of Introduction: 1975 Proliferation: At least 1 country Description: Crew: 5 Platform (chassis): BMP-1 Combat Weight (mt): 13.2 Chassis Length Overall (m): 6.73 Height Overall (m): 2.14 Width Overall (m): 2.94</p> <p>Automotive Performance: Engine Type: 293 hp Diesel Cruising Range (km): 600 km Speed (km/h): Max Road: 60 Max Off-Road: 35 Cross-Country: INA Max Swim: 7 Fording Depths (m): Amphibious</p> <p>Radio: R-173</p> <p>Protection: Armor, Turret (mm): 23 Armor Hull (mm): 19 Self-Entrenching Blade: No NBC Protection System: Yes Smoke Equipment: Vehicle engine exhaust smoke system (VEESS)</p> <p>ARMAMENT Main Armament: Caliber, Type, Name: 7.62-mm machinegun PKT Mount Type: coax Direct Fire Range (m): 1300 Max Effective Range (m): Day: 1000 / 400-500 on the move Night: 800 Fire on Move: Yes Rate of Fire (rpm): 600 cyclic in 2-10 round bursts</p>	<p>VARIANTS None</p> <p>SENSORS/COMPONENTS</p> <p>PRP-3 Sensors/Components: navigation: 1G25 gyrocompass and 1G13 gyro course indicator fire direction: 1V520 Ballistic Computer</p> <p>right side sensors: 1PN61 Night Vision sensor and 1D11 Laser Range-finder</p> <p>left side sensors: none</p> <p>Radar: 1RL126 Small Fred Radar operating band: K (36.2 – 37.0 GHz) detection range: 20 km tracking range: 7 – 12 km</p> <p>PRP-4 Sensors/Components: navigation: 1G25-1 gyrocompass and 1G13 gyro course indicator fire direction: 1V520 Ballistic Computer</p> <p>right side sensors: 1PN61 Night Vision sensor and 1D11M-1 Laser Rangefinder</p> <p>left side sensors: 1PN59 Thermal Imaging Night Vision Device and 1D14 Laser Rangefinder</p> <p>Radar: 1RL133M-1 Tall Mike Radar operating band: I (9.0 GHz) detection range (personnel): 3.0 km detection range (vehicle): 12 km</p>	

NOTES

The PRP-4M has improved 1PN71 night vision sensors. The vehicles are also equipped with a NBC filtration and overpressure system.

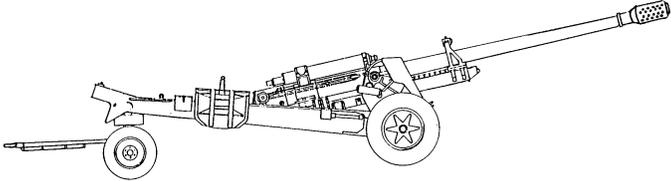
Russian 122-mm Towed Howitzer D-30A

	<p style="text-align: center;">Weapons & Ammunition Types</p> <p style="text-align: center;">122-mm howitzer</p> <p style="text-align: center;">Frag-HE Smoke Illumination</p>	<p style="text-align: center;">Typical Combat Load</p>
<p>SYSTEM Alternative Designations: 122-mm D-30A Lyagushka Date of Introduction: 1963 Proliferation: At least 13 countries Description: Crew: 5 (section of 6) Carriage: D-30 Combat Weight (mt): 3.2 Chassis Length Overall (m): Travel Position: 5.4 Firing Position: INA Height Overall (m): 1.6 Width Overall (m): Travel Position: 1.9 Firing Position: INA Towing Speed (km/h): Max Road: 60 Max Off-Road: 25 Max Cross-Country: Fording Depths (m): .5 Emplacement Time (min): 1.5 Displacement Time (min): 3.5</p> <p>Prime Mover: MT-LB; Ural-375, or equivalent</p> <p>ARMAMENT Main Armament: Caliber, Type, Name: 122-mm, 2A18M canon Barrel Length (cal): 38 (approximately) Rate of Fire (rpm): Burst: 8 Normal: 6 Sustained: 4 Loader Type: Semi-automatic Breech Type: Vertical sliding wedge Muzzle Brake Type: Multi-baffle Traverse (°): Left: 360 Right: 360 Total: 360 Elevation (°) (-/+): -7/+70°</p>	<p>FIRE CONTROL Indirect Fire: PG-1M Panoramic Telescope (PANTEL) Direct Fire: OP 4M-45 Collimator: K-1 Gun Display Unit: None Fire Control Computer: None</p> <p>VARIANTS Saddam: Iraqi produced version of the D-30 D30J: Yugoslavian produced version of the D-30 SP 122: Egyptian self-propelled howitzer (M109A2 chassis and turret with an Egyptian made D-30 howitzer). Type 85: Chinese self-propelled howitzer (Chinese Type 85 APC chassis and a licensed produced version of the D-30 in a semi-open superstructure.)</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 122-mm Frag-HE, OF-81 Indirect Fire Range (m): Minimum Range: 1000 Maximum Range: 15,300 Complete Projectile Weight (kg): 21.76 (OF-56) Muzzle Velocity: 680 m/s Fuze Type: RGM-2 PD</p> <p>122-mm, HEAT-FS Direct Fire Range (m): Minimum Range: 0 Maximum Range: 1000 Armor Penetration (mm): 460 (@ 0° obliquity any range) Complete Projectile Weight (kg): 21.58 Muzzle Velocity: 740 m/s Fuze Type: GPV-2 PIBD</p> <p>122-mm Frag-HE Rocket Assisted Indirect Fire Range (m): Minimum Range: INA Maximum Range: 21,900 Complete Projectile Weight (kg): 21.76 (3OF-56) Muzzle Velocity: INA Fuze Type: PD</p> <p>Other Ammunition Types: Incendiary, Chemical, Flechette, Semi-active laser-guided Kitolov-2M Frag-HE</p>	

NOTES

The D-30A is a midlife product improvement of the D-30. The original D-30 was fielded in 1963 and the midlife product improvements occurred in the mid to late 1970's. The original D-30 is in use with at least 50 different countries.

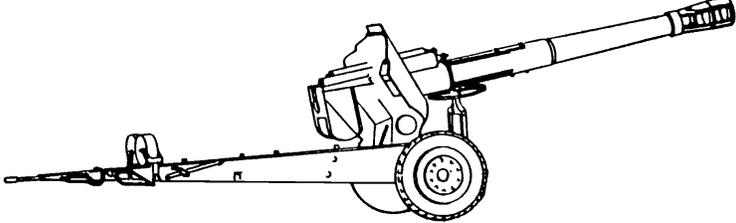
Russian 130-mm Towed Gun M-46

	<p style="text-align: center;">Weapons & Ammunition Types</p> <p style="text-align: center;">130-mm howitzer</p> <p style="text-align: center;">Frag-HE Smoke Illumination</p>	<p style="text-align: center;">Typical Combat Load</p>
<p>SYSTEM Alternative Designations: None Date of Introduction: 1954 Proliferation: At least 25 countries Description: Crew: 8 Carriage: M-46 Combat Weight (mt): 8.45 Chassis Length Overall (m): Travel Position: 11.73 Firing Position: 11.10 Height Overall (m): 2.55 Width Overall (m): Travel Position: 2.45 Firing Position: INA Towing Speed (km/h): Max Road: 50 Max Off-Road: 20 Max Cross-Country: 10 Fording Depths (m): INA Emplacement Time (min): 6 Displacement Time (min): 7</p> <p>Prime Mover: AT-S 59, KrAZ-255 or equivalent</p> <p>ARMAMENT Main Armament: Caliber, Type, Name: 130-mm, canon Barrel Length (cal): 52 (approximately) Rate of Fire (rpm): Burst: 8 Normal: 6 Sustained: 5 Loader Type: Manual Breech Type: Horizontal sliding wedge Muzzle Brake Type: Multiperforated (pepperpot) Traverse (°): Left: 25 Right: 25 Total: 50 Elevation (°) (-/+): -2.5/+45°</p>	<p>FIRE CONTROL Indirect Fire: PG-1 Panoramic Telescope (PANTEL) Direct Fire: OP 4-35 Collimator: K-1 Gun Display Unit: None Fire Control Computer: None</p> <p>VARIANTS None</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 130-mm Frag-HE, OF44 Indirect Fire Range (m): Minimum Range: INA Maximum Range: 22,500 Complete Projectile Weight (kg): 33.40 (OF33) Muzzle Velocity: 930 m/s Fuze Type: V-429 PD</p> <p>130-mm, APC-T Direct Fire Range (m): Minimum Range: 0 Maximum Range: 1140 Armor Penetration (mm): INA Complete Projectile Weight (kg): 33.49 (BR-482B) Muzzle Velocity: INA Fuze Type: DBR BD</p> <p>130-mm Frag-HE, OF-43 Indirect Fire Range (m): Minimum Range: INA Maximum Range: 27,500 Complete Projectile Weight (kg): 33.40 (OF-33) Muzzle Velocity: 930 m/s Fuze Type: V-429 PD</p> <p>130-mm Frag-HE, ERFB-BB Indirect Fire Range (m): Minimum Range: INA Maximum Range: 38,000 Complete Projectile Weight (kg): 33.40 Muzzle Velocity: 940 m/s Fuze Type: ML-5 PD</p> <p>Other Ammunition Types: Smoke, Chemical, Illumination</p>	

NOTES:

The M-46 gun crew is provided limited frontal protections by virtue of a frontal V-shaped shield (approximately 7-mm thick). Otherwise, the crew, ammunition supply, and equipment are vulnerable to casualties and damage from small arms fire, artillery fire, and bomb shrapnel. The Extended Range Full Bore-Base Bleed round was specifically designed by NORINCO Industries (China) for use with the Chinese 130-mm Type 59 Field Gun. However, this round may be fired by the M-46.

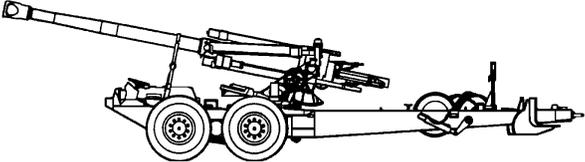
Russian 152-mm Towed Gun-Howitzer D-20

	<p>Weapons & Ammunition Types</p> <p>152-mm howitzer</p> <p>Frag-HE Smoke Illumination</p>	<p>Typical Combat Load</p>
<p>SYSTEM Alternative Designations: None Date of Introduction: 1955 Proliferation: At least 13 countries Description: Crew: 8 Carriage: 122-mm gun D-74 Combat Weight (mt): 5.7 Chassis Length Overall (m): Travel Position: 8.10 Firing Position: 8.69 Height Overall (m): 2.52 Width Overall (m): Travel Position: 2.35 Firing Position: INA Towing Speed (km/h): Max Road: 60 Max Off-Road: 30 Max Cross-Country: 15 Forging Depths (m): .5 Emplacement Time (min): 2.5 Displacement Time (min): 2.5</p> <p>Prime Mover: AT-S Tracked vehicle; MT-LB; Ural-375; Ural-4320</p> <p>ARMAMENT Main Armament: Caliber, Type, Name: 152-mm, canon Barrel Length (cal): 25 Rate of Fire (rpm): Burst: 5-6 Normal: INA Sustained: 1 (65 rounds the first hour) Loader Type: Manual Breech Type: Vertical sliding wedge Muzzle Brake Type: Double flared Traverse (°): Left: 29 Right: 29 Total: 58 Elevation (°) (-/+):-5/+45°</p>	<p>FIRE CONTROL Indirect Fire: PG-1M Panoramic Telescope (PANTEL) Direct Fire: OP 4M Collimator: K-1 Gun Display Unit: None Fire Control Computer: None</p> <p>VARIANTS None</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 152-mm Frag-HE, OF32 Indirect Fire Range (m): Minimum Range: 4600 Maximum Range: 17,400 Complete Projectile Weight (kg): 43.56 (OF25) Muzzle Velocity: 655 m/s Fuze Type: V-90 PD</p> <p>152-mm, HEAT, BP-540 Direct Fire Range (m): Minimum Range: 0 Maximum Range: 1000 Armor Penetration (mm): INA Complete Projectile Weight (kg): 27.00 Muzzle Velocity: 655 m/s Fuze Type: GPV-3 PD</p> <p>152-mm Frag-HE, OF-96 Indirect Fire Range (m): Minimum Range: INA Maximum Range: 24,400 Complete Projectile Weight (kg): 43.56 (OF-64) Muzzle Velocity: INA Fuze Type: PD</p> <p>Other Ammunition Types: DPICM, DPICM-BB, Incendiary, Expendable Jammer, Chemical, Flechette, Semi-active laser-guided Krasnopol-M Frag-HE</p>	

NOTES

The D-20 was the first 152-mm cannon system to incorporate a semiautomatic vertical-sliding-wedge breech block. Although the ammunition for the system was not changed, this modification allowed a slightly higher rate of fire to be achieved (6 rounds per minute rather than 4), although the sustained rate of fire was unchanged. Because the carriage is based on that of the 122-mm gun D-74, the D-20 cannot be elevated above 45°.

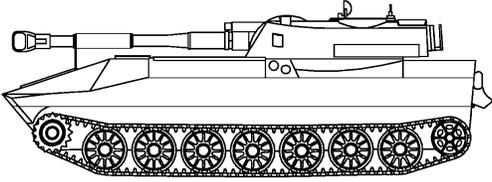
South African 155-mm Towed Gun-Howitzer G5

	<p>Weapons & Ammunition Types</p> <p>155-mm howitzer</p> <p>Frag-HE Smoke Illumination</p>	<p>Typical Combat Load</p>
<p>SYSTEM Alternative Designations: None Date of Introduction: 1981 Proliferation: At least 4 countries Description: Crew: 8 Carriage: G5 Combat Weight (mt): 13.75 Chassis Length Overall (m): Travel Position: 12.1 Firing Position: 11.0 Height Overall (m): 2.3 Width Overall (m): Travel Position: 3.3 Firing Position: 8.7 Towing Speed (km/h): Max Road: 90 Max Off-Road: 50 Max Cross-Country: 15 Fording Depths (m): .6 Emplacement Time (min): 2 Displacement Time (min): 1</p> <p>Auxiliary Propulsion Unit Performance: Engine Type: 76 hp air-cooled diesel Cruising Range (km): 100 Speed (km/h): Max Road: 16 Max Off-Road: INA Cross-Country: 3 Max Swim: N/A</p> <p>Prime Mover: Samil 100 6x6 artillery tractor or a 10 ton equivalent</p> <p>ARMAMENT Main Armament: Caliber, Type, Name: 155-mm, canon Barrel Length (cal): 45 Rate of Fire (rpm): Burst: 3 Normal: 2 Sustained: 2</p>	<p>Loader Type: Semi-automatic Breech Type: Interrupted screw Muzzle Brake Type: Single baffle Traverse: (°): Left: 41 Right: 41 Total: 82 Elevation (°) (-/+): -3/+75°</p> <p>FIRE CONTROL Indirect Fire: Digital Panoramic Telescope Direct Fire: Trunnion mounted telescopic sight Collimator: INA Gun Display Unit: None Fire Control Computer: None</p> <p>VARIANTS G-5 MkIII Upgrade of G-5 (see NOTES)</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 155-mm Frag-HE, M1 HE Indirect Fire Range (m): Minimum Range: 3000 Maximum Range: 30,000 Complete Projectile Weight (kg): 8.7 Muzzle Velocity: 897 m/s Fuze Type: PD M841</p> <p>155-mm Frag-HE BB, M1 HE Indirect Fire Range (m): Minimum Range: INA Maximum Range: 39,000 Complete Projectile Weight (kg): 8.7 Muzzle Velocity: 895 m/s Fuze Type: PD M841</p> <p>Other Ammunition Types: See NOTES</p>	

NOTES

The G5 is fully compatible with NATO standard 155-mm ammunition and has a direct fire range of 3000 meters (using a Frag-HE round). The APU, combined with the tandem walking-beam suspension, gives the G5 excellent self-propelled mobility over short distances. The four wheels are all powered and give the gun excellent traction over most terrain. But, the APU serves purposes other than mobility. It provides power to open and close the trails, raise and lower the trail wheels, and raise and lower the firing platform. However, there is no power traverse or elevation. Although designed for an eight-man section, the South African Defense Force normally operates the G5 with a five-man section. However, the G5 can operate with minimum of two people when all of the powered systems are working. The G-5 MkIII includes 35 reliability modifications and performance improvements. The improvements include the addition of the AS2000 Gun Monitor, an improved braking system, bigger diameter and wider trail wheels (specifically designed for sand), and incorporation of the REUTECH ACV 58 Communications System.

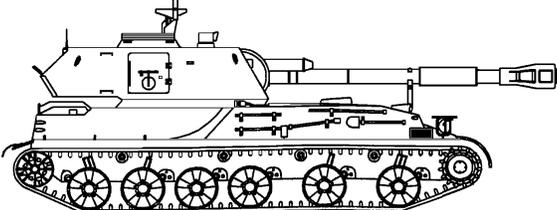
Russian 122-mm Self-Propelled Howitzer 2S1

	<p style="text-align: center;">Weapons & Ammunition Types</p> <p style="text-align: center;">122-mm howitzer</p> <p style="text-align: center;">Frag-HE HEAT-FS Smoke Illumination</p>	<p style="text-align: center;">Typical Combat Load</p> <p style="text-align: center;">45</p>
<p>SYSTEM Alternative Designations: 122-mm 2S1 Gvozdika Date of Introduction: 1974 Proliferation: At least 12 countries Description: Crew: 4 (section of 6 with 2 in ammo carrier) Platform (chassis): MT-LBu Combat Weight (mt): 15.7 Chassis Length Overall (m): 7.26 Height Overall (m): 2.72 Width Overall (m): 2.85</p> <p>Automotive Performance: Engine Type: V-8, 300 hp, Diesel Cruising Range (km): 500 km Speed (km/h): Max Road: 60 Max Off-Road: 30 Cross-Country: INA Max Swim: 4.5 Fording Depths (m): Amphibious Emplacement Time (min): 2 Displacement Time (min): 1</p> <p>Radio: R-123M</p> <p>Protection: Armor, Turret (mm): 20 Armor Turret Top (mm): 10 Armor Hull (mm): 15 Self-Entrenching Blade: No NBC Protection System: Yes Smoke Equipment: No</p> <p>ARMAMENT Main Armament: Caliber, Type, Name: 122-mm, canon, 2A31 Barrel Length (cal): 36 Rate of Fire (rpm): Burst: 5 Normal: 4 Sustained: 1-2 Fire from Ground: INA Loader Type: Semi-automatic Breech Type: Horizontal sliding wedge</p>	<p>Muzzle Brake Type: Double baffle Traverse (°): Left: 360 Right: 360 Total: 360 Elevation (°) (-/+): -3/+70°</p> <p>FIRE CONTROL Indirect Fire: PG-2 Panoramic Telescope (PANTEL) Direct Fire: OP 5-37 Collimator: K-1 Gun Display Unit: None Fire Control Computer: None</p> <p>VARIANTS None</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 122-mm Frag-HE, OF-81 Indirect Fire Range (m): Minimum Range: 1000 Maximum Range: 15,300 Complete Projectile Weight (kg): 21.76 (OF-56) Muzzle Velocity: 680 m/s Fuze Type: RGM-2 PD</p> <p>122-mm, HEAT-FS Direct Fire Range (m): Minimum Range: 0 Maximum Range: 1000 Armor Penetration (mm): 460 (@ 0° obliquity any range) Complete Projectile Weight (kg): 21.58 Muzzle Velocity: 740 m/s Fuze Type: GPV-2 PIBD</p> <p>122-mm Frag-HE Rocket Assisted Indirect Fire Range (m): Minimum Range: INA Maximum Range: 21,900 Complete Projectile Weight (kg): 21.76 (3OF-56) Muzzle Velocity: INA Fuze Type: PD</p> <p>Other Ammunition Types: Incendiary, Chemical, Flechette, Expendable Jammer, Semi-active laser-guided Kitolov-2M Frag-HE</p>	

NOTES

The 2S1's ammunition stowage rack is not mechanized. The 2S1 is manually loaded with a semiautomatic ramming capability. The four-man crew consists of the commander, driver, gunner, and loader.

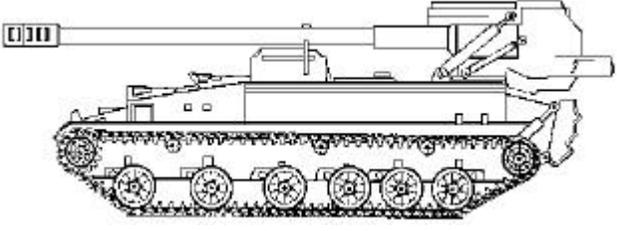
Russian 152-mm Self-Propelled Gun-Howitzer 2S3M

	<p>Weapons & Ammunition Types</p> <p>152-mm howitzer</p> <p>Frag-HE Smoke Illumination</p> <p>7.62 PKT MG</p>	<p>Typical Combat Load</p> <p>46</p> <p>1500</p>
<p>SYSTEM</p> <p>Alternative Designations: 152-mm 2S3M Akatsiya</p> <p>Date of Introduction: 1973</p> <p>Proliferation: At least 8 countries</p> <p>Description:</p> <p>Crew: 4</p> <p>Platform (chassis): Modified SA-4 Ganef</p> <p>Combat Weight (mt): 27.5</p> <p>Chassis Length Overall (m): 7.75</p> <p>Height Overall (m): 3.13</p> <p>Width Overall (m): 3.21</p> <p>Automotive Performance:</p> <p>Engine Type: 520-hpV-59 V-12 multi-fuel diesel</p> <p>Cruising Range (km): 450 km</p> <p>Speed (km/h):</p> <ul style="list-style-type: none"> Max Road: 60 Max Off-Road: 25 Cross-Country: INA Max Swim: N/A <p>Fording Depth (m): 1.00</p> <p>Emplacement Time (min): 3</p> <p>Displacement Time (min): 3</p> <p>Radio: R-123M</p> <p>Protection:</p> <p>Armor, Turret (mm): 20</p> <p>Armor Turret Top (mm): 15</p> <p>Armor Hull (mm): INA</p> <p>Self-Entrenching Blade: Yes</p> <p>NBC Protection System: Yes</p> <p>Smoke Equipment: No</p> <p>ARMAMENT</p> <p>Main Armament:</p> <p>Caliber, Type, Name: 152-mm, 2A33</p> <p>Barrel Length (cal): 34</p> <p>Rate of Fire (rpm):</p> <ul style="list-style-type: none"> Burst: 4 Normal: 3 Sustained: 1 Fire from Ground: INA <p>Loader Type: Semiautomatic</p> <p>Breech Type: Vertical sliding wedge</p> <p>Muzzle Brake Type: Double baffle</p> <p>Traverse (°):</p> <ul style="list-style-type: none"> Left: 360 Right: 360 Total: 360 <p>Elevation (°) (-/+): -4/+60°</p>	<p>Auxiliary Weapon:</p> <p>Caliber, Type, Name: 7.62-mm machinegun PKT</p> <p>Mount Type: Bow (ball-mounted)</p> <p>Direct Fire Range (m): 1000</p> <p>Max Effective Range (m):</p> <ul style="list-style-type: none"> Day: 1000 /400-500 on the move Night: 800 <p>Fire on Move: Yes</p> <p>Rate of Fire (rpm): 650 (cyclic)</p> <p>FIRE CONTROL</p> <p>Indirect Fire: PG-4 Panoramic Telescope (PANTEL)</p> <p>Direct Fire: OP 5-38</p> <p>Collimator: K-1</p> <p>Gun Display Unit: None</p> <p>Fire Control Computer: None</p> <p>VARIANTS</p> <p>2S3M1: Upgrade of 2S3M</p> <p>MAIN ARMAMENT AMMUNITION</p> <p>Caliber, Type, Name:</p> <p>152-mm Frag-HE, OF32</p> <p>Indirect Fire Range (m):</p> <ul style="list-style-type: none"> Minimum Range: 4600 Maximum Range: 17,400 <p>Complete Projectile Weight (kg): 43.56 (OF25)</p> <p>Muzzle Velocity: 655 m/s</p> <p>Fuze Type: V-90 PD</p> <p>152-mm, HEAT, BP-540</p> <p>Direct Fire Range (m):</p> <ul style="list-style-type: none"> Minimum Range: 0 Maximum Range: 1000 <p>Armor Penetration (mm): INA</p> <p>Complete Projectile Weight (kg): 27.00</p> <p>Muzzle Velocity: 655 m/s</p> <p>Fuze Type: GPV-3 PD</p> <p>152-mm Frag-HE, OF-96</p> <p>Indirect Fire Range (m):</p> <ul style="list-style-type: none"> Minimum Range: INA Maximum Range: 24,400 <p>Complete Projectile Weight (kg): 43.56 (OF-64)</p> <p>Muzzle Velocity: INA</p> <p>Fuze Type: PD</p> <p>Other Ammunition Types: DPICM, DPICM-BB, Incendiary, Chemical, Flechette, Semi-active laser-guided Krasnopol-M Frag-HE</p>	

NOTES

The 2S3M is an upgrade version of the 2S3. The 2S3M turret contains the 2A33 cannon, fire-control equipment, ammunition storage space, and work positions for commander, gunner, and loader. The cannon extends beyond the vehicle front and has an electrical loader/rammer attached to the cradle. Ammunition is stored in the rear of the chassis and can be replenished through a hatch in the rear panel.

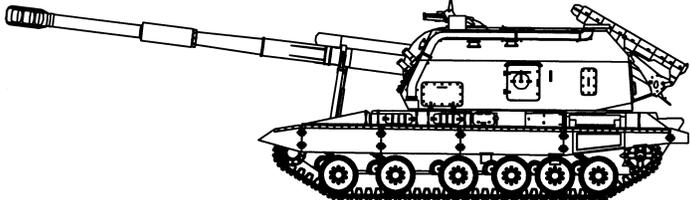
Russian 152-mm Self-Propelled Gun 2S5

	<p style="text-align: center;">Weapons & Ammunition Types</p> <p>152-mm howitzer Frag-HE Smoke Illumination</p> <p>7.62 PKT MG</p>	<p style="text-align: center;">Typical Combat Load</p> <p style="text-align: center;">30</p> <p style="text-align: center;">1500</p>
<p>SYSTEM Alternative Designations: 152-mm 2S5 Giatsint-S Date of Introduction: 1981 Proliferation: At least 4 countries Description: Crew: 5 (section of 7 with 2 in ammo carrier) Platform (chassis): Modified 2S3 Combat Weight (mt): 28.2 Chassis Length Overall (m): 8.33 Height Overall (m): 2.76 Width Overall (m): 3.25</p> <p>Automotive Performance: Engine Type: 520-hp V-59-V-12 multi-fuel diesel Cruising Range (km): 500 km Speed (km/h): Max Road: 63 Max Off-Road: 25 Cross-Country: INA Max Swim: 4.5 Fording Depths (m): 1.05 Emplacement Time (min): 2 Displacement Time (min): 1</p> <p>Radio: R-123M</p> <p>Protection: Armor, Turret (mm): INA Armor Turret Top (mm): 15 Armor Hull (mm): 15 Self-Entrenching Blade: Yes NBC Protection System: Yes Smoke Equipment: None</p> <p>ARMAMENT Main Armament: Caliber, Type, Name: 152-mm, canon, 2A37 Barrel Length (cal): 52 Rate of Fire (rpm): Burst: 6 Normal: 5 Sustained: 1-2 Fire from Ground: INA Loader Type: Semi-automatic Breech Type: Horizontal sliding wedge Muzzle Brake Type: Multi baffle Traverse (°): Left: 15 Right: 15 Total: 30 Elevation (°) (-/+): -2/+57°</p>	<p>Auxiliary Weapon: Caliber, Type, Name: 7.62-mm machinegun PKT Mount Type: Bow (ball-mounted) Direct Fire Range (m): 1000 Max Effective Range (m): Day: 1000 /400-500 on the move Night: 800 Fire on Move: Yes Rate of Fire (rpm): 650 (cyclic)</p> <p>FIRE CONTROL Indirect Fire: PG-1M Panoramic Telescope (PANTEL) Direct Fire: N/A Collimator: K-1 Gun Display Unit: None Fire Control Computer: None</p> <p>VARIANTS None</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 152-mm Frag-HE, OF-39 Indirect Fire Range (m): Minimum Range: 9100 Maximum Range: 28,400 Complete Projectile Weight (kg): 43.51 (OF-29) Muzzle Velocity: 945 m/s Fuze Type: V-429 PD</p> <p>152-mm, HEAT, BP-540 Direct Fire Range (m): Minimum Range: 0 Maximum Range: 1000 Armor Penetration (mm): INA Complete Projectile Weight (kg): 27.00 Muzzle Velocity: 655 m/s Fuze Type: GPV-3 PD</p> <p>152-mm Frag-HE, OF-86 Indirect Fire Range (m): Minimum Range: INA Maximum Range: 30,500 Complete Projectile Weight (kg): 43.8 (OF-59) Muzzle Velocity: 945 m/s Fuze Type: V-429 PD</p> <p>Other Ammunition Types: DPICM, DPICM-BB, Incendiary, Chemical, Flechette, Semi-active laser-guided Krasnopol-M Frag-HE</p>	

NOTES

The 2S5 is more powerful, has a longer range and a higher rate of fire than the 2S3. However, the 2S5 has a limited main armament traverse and a narrower elevation range than the 2S3.

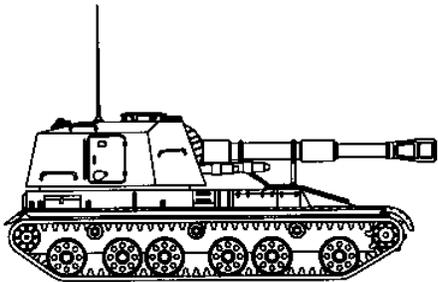
Russian 152-mm Self-Propelled Howitzer 2S19

	<p>Weapons & Ammunition Types</p> <p>152-mm howitzer</p> <p>Frag-HE Smoke Illumination</p> <p>12.7-mm MG</p>	<p>Typical Combat Load</p> <p>50</p> <p>300</p>
<p>SYSTEM Alternative Designations: 152-mm 2S19 Msta-S Date of Introduction: 1989 Proliferation: At least 4 countries Description: Crew: 5 (section of 7 with 2 in ammo carrier) Platform (chassis): Modified T-72 Combat Weight (mt): 42 Chassis Length Overall (m): 11.91 Height Overall (m): 2.98 Width Overall (m): 3.58</p> <p>Automotive Performance: Engine Type: 840-hp V84-A diesel Cruising Range (km): 500 km Speed (km/h): Max Road: 60 Max Off-Road: 25 Cross-Country: INA Max Swim: N/A Fording Depths (m): Unprepared: 1.5 Emplacement Time (min): 1-2 Displacement Time (min): 1-2</p> <p>Radio: R-173</p> <p>Protection: Armor, Turret (mm): 15 Armor Turret Top (mm): 15 Armor Hull (mm): 15 Self-Entrenching Blade: Capable of digging a complete firing pit in 40-60 minutes NBC Protection System: Yes Smoke Equipment: Six Type 902 smoke grenade launchers and Vehicle engine exhaust smoke system (VEESS)</p> <p>ARMAMENT Main Armament: Caliber, Type, Name: 152-mm, canon, 2A64 Barrel Length (cal): 48 Rate of Fire (rpm): Burst: 8 Normal: 6 Sustained: 2 Fire from Ground: 6-7 Loader Type: autoloader Breech Type: Vertical sliding wedge Muzzle Brake Type: Double baffle Traverse: (°): Left: 360 Right: 360</p>	<p>Total: 360 Elevation (°) (-/+): -4/+68°</p> <p>Auxiliary Weapon: Caliber, Type, Name: 12.7-mm NSVT machinegun Mount Type: PZU-5 AA Direct Fire Range (m): 2000 Max Effective Range (m): Day: 1500 (AA)/1500 (Ground) Night: N/A Fire on Move: Yes Rate of Fire (rpm): 800 (cyclic)</p> <p>FIRE CONTROL Indirect Fire: 1P22 Panoramic Telescope (PANTEL) Direct Fire: 1P23 Collimator: K-1 Gun Display Unit: None Fire Control Computer: None</p> <p>VARIANTS None</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 152-mm Frag-HE, OF-72 Indirect Fire Range (m): Minimum Range: 6500 Maximum Range: 24,700 Complete Projectile Weight (kg): 43.56 (OF-45) Muzzle Velocity: 864 m/s Fuze Type: RGM-2 PD</p> <p>152-mm, HEAT, BP-540 Direct Fire Range (m): Minimum Range: 0 Maximum Range: 1000 Armor Penetration (mm): INA Complete Projectile Weight (kg): 27.00 Muzzle Velocity: 655 m/s Fuze Type: GPV-3 PD</p> <p>152-mm Frag-HE BB, OF-91 Indirect Fire Range (m): Minimum Range: 6710 Maximum Range: 29,000 Complete Projectile Weight (kg): 42.86 (OF-61) Muzzle Velocity: 828 m/s Fuze Type: KZ-88 PD</p> <p>Other Ammunition Types: All standard 152-mm artillery rounds</p>	

NOTES

The 2S19's gun crew can load the gun at any angle of elevation. The 2S19 can also produce a smokescreen by injecting diesel fuel into the exhaust outlet. The 21-hp gas turbine AP-18D Auxiliary Power Unit provides power for turret operations when the vehicle engine is shut down.

Chinese 152-mm Self-Propelled Gun-Howitzer Type 83

	Weapons & Ammunition Types	Typical Combat Load
<p>SYSTEM Alternative Designations: None Date of Introduction: 1984 Proliferation: At least 1 country Description: Crew: 5 Platform (chassis): Type 83 Combat Weight (mt): 30.0 Chassis Length Overall (m): 7.33 Height Overall (m): 3.50 Width Overall (m): 3.24</p> <p>Automotive Performance: Engine Type: Type 12150L, V-12, 520-hp liquid-cooled diesel Cruising Range (km): 450 km Speed (km/h): Max Road: 55 Max Off-Road: 35 Cross-Country: INA Max Swim: N/A Fording Depth (m): 1.3 Emplacement Time (min): 1 Displacement Time (min): 1</p> <p>Radio: Type 889D</p> <p>Protection: Armor, Turret (mm): INA Armor Turret Top (mm): INA Armor Hull (mm): INA Self-Entrenching Blade: No NBC Protection System: No Smoke Equipment: No</p> <p>ARMAMENT Main Armament: Caliber, Type, Name: 152-mm, Type 66 cannon Barrel Length (cal): 29 Rate of Fire (rpm): Burst: 4 Normal: INA Sustained: INA Fire from Ground: INA</p>	<p>152-mm howitzer</p> <p>Frag-HE Smoke Illumination</p> <p>12.7-mm MG</p> <p>7.62-mm MG</p>	<p>30</p> <p>650</p> <p>650</p>
	<p>Loader Type: Semiautomatic Breech Type: Vertical sliding wedge Muzzle Brake Type: Double baffle Traverse (°): Left: 360 Right: 360 Total: 360 Elevation (°) (-/+): -5/+65°</p> <p>Auxiliary Weapon: Caliber, Type, Name: 12.7-mm (12.7x108) AA MG Type 54 Mount Type: Turret top Direct Fire Range (m): 1500 Max Effective Range (m): Day: 1500 ground/1600 for air targets (APDS) Night: INA Fire on Move: Yes Rate of Fire (rpm): 80-100 practical, 600 for air targets in 2-10 round bursts</p> <p>Caliber, Type, Name: 7.62 (7.62 x 54R) Machinegun Type 59 Mount Type: Turret coax Direct Fire Range (m): 1800 Max Effective Range (m): Day: 1000 Night: 800 Fire on Move: Yes Rate of Fire (rpm): 250 practical, 600 cyclic in 2-10 round bursts</p> <p>FIRE CONTROL Indirect Fire: Panoramic Direct Fire: INA Collimator: INA Gun Display Unit: None Fire Control Computer: None</p> <p>VARIANTS 425-mm Mineclearing Rocket Launcher Type 462: 2-round rocket launcher for use in clearing minefields.</p> <p>120-mm SP Anti-Tank Gun: The AT gun is fitted with a 120-mm smoothbore mounted inside a turret on a Type 83 Gun-Howitzer chassis.</p>	

Worldwide Equipment Guide

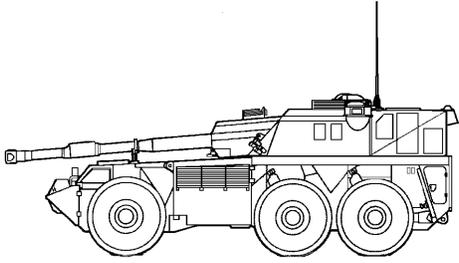
Chinese 152-mm Self-Propelled Gun-Howitzer Type 83 continued

<p>MAIN ARMAMENT AMMUNITION</p> <p>Caliber, Type, Name: 152-mm Frag-HE, Type 66 Indirect Fire Range (m): Minimum Range: 9600 Maximum Range: 17,230 Complete Projectile Weight (kg): 43.6 Muzzle Velocity: 655 m/s Fuze Type: Liu-4 PD and Proximity</p> <p>152-mm Frag-HE Rocket Assisted Projectile Indirect Fire Range (m): Minimum Range: INA Maximum Range: 21,880 Complete Projectile Weight (kg): INA Muzzle Velocity: INA Fuze Type: PD</p>	<p>152-mm Frag-HE Type 83 Indirect Fire Range (m): Minimum Range: INA Maximum Range: 30,370 Complete Projectile Weight (kg): 46.95 Muzzle Velocity: 955 m/s Fuze Type: Liu-4 PD and Proximity</p> <p>Other Ammunition Types: HE-I, Illumination, Smoke</p>
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NOTES

The Type 83 152-mm SP Gun-Howitzer is capable of firing all standard types of 152-mm rounds. The main armament cannon is based on the Chinese 152-mm Towed Type 66 mounted on a vehicle hull similar to the Russian 152-mm SP Gun-Howitzer 2S3. The crew communicates with each other using the Type 803 intercom system. There are reports of the Type 83 being equipped with an anti-tank rocket launcher referred to as the Type 40. However, it is suspected that the rocket launcher is really the 40-mm anti-tank rocket launcher Type 69-1 (an upgraded variant of the Russian RPG-7).

South African 155-mm Self-Propelled Howitzer G6

	<p style="text-align: center;">Weapons & Ammunition Types</p> <p>155-mm howitzer</p> <p>Frag-HE Smoke Illumination</p> <p>.50 Cal. M2 HB MG</p>	<p style="text-align: center;">Typical Combat Load</p> <p style="text-align: center;">45</p> <p style="text-align: center;">900</p>
<p>SYSTEM Alternative Designations: 155-mm G6 Rhino Date of Introduction: 1988 Proliferation: At least 2 countries Description: Crew: 6 Platform (chassis): Purpose built 6x6 wheeled Combat Weight (mt): 48 Chassis Length Overall (m): 10.4 Height Overall (m): 3.5 Width Overall (m): 3.4</p> <p>Automotive Performance: Engine Type: 525-hp air-cooled diesel Cruising Range (km): 700 km Speed (km/h): Max Road: 85 Max Off-Road: 30 Cross-Country: INA Max Swim: N/A Fording Depth (m): 1.00 Emplacement Time (min): 1 Displacement Time (min): 0.5</p> <p>Radio: INA</p> <p>Protection: Armor, Turret (mm): See NOTES Armor Turret Top (mm): See NOTES Armor Hull (mm): See NOTES Self-Entrenching Blade: No NBC Protection System: Yes Smoke Equipment: 8 81-mm grenade launchers</p> <p>ARMAMENT Main Armament: Caliber, Type, Name: 155-mm, canon Barrel Length (cal): 45 Rate of Fire (rpm): Burst: 3 Normal: 2 Sustained: 1 Fire from Ground: INA Loader Type: Semi-automatic Breech Type: Interrupted screw</p>	<p>Muzzle Brake Type: Single baffle Traverse: (°): Left: 40 Right: 40 Total: 80 Elevation (°) (-/+): -5/+75°</p> <p>Auxiliary Weapon: Caliber, Type, Name: .50 (12.7x99) heavy machinegun, M2HB Mount Type: Cupola AA mount Direct Fire Range (m): INA Max Effective Range (m): Day: 1000 Night: INA Fire on Move: Yes Rate of Fire (rpm): 450-550 (cyclic)</p> <p>FIRE CONTROL Indirect Fire: Digital Panoramic Telescope Direct Fire: Trunnion mounted telescopic sight Collimator: INA Gun Display Unit: None Fire Control Computer: None</p> <p>VARIANTS None</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 155-mm Frag-HE, M1 HE Indirect Fire Range (m): Minimum Range: 3000 Maximum Range: 30,000 Complete Projectile Weight (kg): 8.7 Muzzle Velocity: 897 m/s Fuze Type: PD M841</p> <p>155-mm Frag-HE BB, M1 HE Indirect Fire Range (m): Minimum Range: INA Maximum Range: 39,000 Complete Projectile Weight (kg): 8.7 Muzzle Velocity: 895 m/s Fuze Type: PD M841</p> <p>Other Ammunition Types: See NOTES</p>	

South African 155-mm Self-Propelled Howitzer G6 continued _____

NOTES

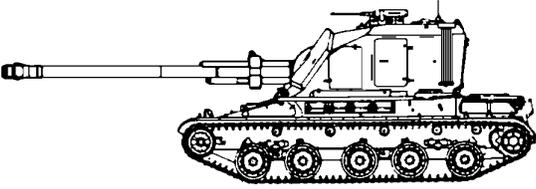
The G6 is a three-axle, six-wheeled, heavily armored system mounting a modified version of the G5 cannon. The G6 is fully compatible with NATO standard 155-mm ammunition and has a direct fire range of 3000 meters (using a Frag-HE round). The rigid chassis is actually divided into two parts, a driver's/engine compartment and a crew compartment. In order to distribute its weight and to maintain mobility over sand and soft terrain, the G6 employs large 21x25 run-flat tires. The driver controls a central tire-inflation system to vary the ground pressure. The system can also be used to maintain some degree of tire pressure in case of air leakage from small punctures. The G6 is equipped with an electronically controlled hydraulic flick rammer that provides an initial rate of fire of 3 rounds per minute.

The vehicle hull and turret provide protection against 7.62-mm small arms fire and artillery shrapnel. The frontal 60° arc provides protection against 20-mm type ammunition. Additionally, the shape and armor thickness of the chassis hull allows it to withstand at least three mine detonations (against TM46 antitank landmine or equivalent) before being immobilized. The separation of the driver/engine compartment from the crew compartment also facilitates survival against mines. The connection between the two is perforated with blowout holes to direct the force of the blast upwards, away from any personnel compartments. The separation also allows the driver to be beyond the detonation point before the mine is activated. The driver also has bullet-resistant glass windows that can be further protected by armored shutters, although it limits him to the use of a periscopic viewing port. The vehicle commander has limited steering and braking capability if the driver becomes a casualty. The crew compartment has four firing ports (two each side) so the crew can engage targets without exposing themselves to return fire.

A 45-hp (34 kw) Auxiliary Power Unit (APU) provides power for turret operations, recharging the batteries, and the driver/crew compartment air conditioning system. A wide range of optional subsystems is available to increase the efficiency of the G6 and its crew. They include the following:

- Inertial navigation and laying or back-up laying systems
- Night vision equipment
- Barrel cooling and thermal warning systems
- Fire control computer interface
- Muzzle velocity analyzer
- Explosion control for fuel tanks

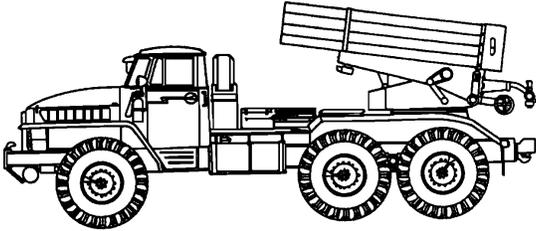
French 155-mm Self-Propelled Howitzer AU-F1

	<p style="text-align: center;">Weapons & Ammunition Types</p> <p>155-mm howitzer</p> <p>Frag-HE Smoke Illumination</p> <p>.50 Cal. M2 HB MG</p>	<p style="text-align: center;">Typical Combat Load</p> <p style="text-align: center;">42</p> <p style="text-align: center;">800</p>
<p>SYSTEM Alternative Designations: 155-mm GCT (Export Version) Date of Introduction: 1979 Proliferation: At least 4 countries Description: Crew: 4 Platform (chassis): Modified AMX-30 Combat Weight (mt): 42.0 Chassis Length Overall (m): 10.25 Height Overall (m): 3.25 Width Overall (m): 3.15</p> <p>Automotive Performance: Engine Type: Hispano-Suiza HS110, 720-hp water-cooled multi-fuel Cruising Range (km): 450 km Speed (km/h): Max Road: 60 Max Off-Road: 40 Cross-Country: INA Max Swim: N/A Fording Depth (m): 2.10 Emplacement Time (min): 1-2 Displacement Time (min): 1</p> <p>Radio: TRC 559 (VHF-FM)</p> <p>Protection: Armor, Turret (mm): See NOTES Armor Turret Top (mm): See NOTES Armor Hull (mm): See NOTES Self-Entrenching Blade: No NBC Protection System: Yes Smoke Equipment: 4 grenade launchers</p> <p>ARMAMENT Main Armament: Caliber, Type, Name: 155-mm, canon Barrel Length (cal): 40 Rate of Fire (rpm): Burst: 8 Normal: 6 Sustained: 2-3 (manual loading) Fire from Ground: INA Loader Type: Autoloader Breech Type: Vertical sliding wedge</p>	<p>Muzzle Brake Type: Double baffle Traverse (°): Left: 360 Right: 360 Total: 360 Elevation (°) (-/+): -4/+66°</p> <p>Auxiliary Weapon: Caliber, Type, Name: .50 (12.7x99) heavy machinegun, M2HB Mount Type: Cupola AA mount Direct Fire Range (m): INA Max Effective Range (m): Day: 1000 Night: INA Fire on Move: Yes Rate of Fire (rpm): 450-550 (cyclic)</p> <p>FIRE CONTROL Indirect Fire: M 589 Optical Goniometer Direct Fire: INA Collimator: INA Gun Display Unit: ATILA fire direction system Fire Control Computer: None</p> <p>VARIANTS AU-F1T: Upgrade of AU-F1</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 155-mm Frag-HE, OE-155-56/69 Indirect Fire Range (m): Minimum Range: 9600 Maximum Range: 23,000 Complete Projectile Weight (kg): 43.75 Muzzle Velocity: 810 m/s Fuze Type: PD</p> <p>155-mm Frag-HE Rocket Assisted H3 Indirect Fire Range (m): Minimum Range: INA Maximum Range: 31,500 Complete Projectile Weight (kg): INA Muzzle Velocity: 830 m/s Fuze Type: PD</p> <p>Other Ammunition Types: DPICM, Illumination, Smoke</p>	

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The export version of the AU-F1 is known as the GCT (Grande Cadence de Tir or high rate of fire). The AU-F1T is fitted with the Sagem Cita 20 inertial navigation system as well as a 20-24 hp gas turbine auxiliary power unit (APU). A four-man gun crew can reload the AU-F1 in 15 minutes. A two-man gun crew can reload the AU-F1 in 20 minutes. The AU-F1's armor provides crew protection against artillery shrapnel and small arms fire.

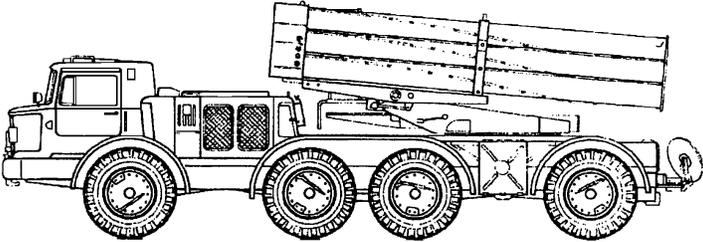
Russian 122-mm Multiple Rocket Launcher BM-21

	<p style="text-align: center;">Weapons & Ammunition Types</p> <p style="text-align: center;">122-mm rocket</p> <p style="text-align: center;">Frag-HE</p>	<p style="text-align: center;">Typical Combat Load</p> <p style="text-align: center;">40</p>
<p>SYSTEM Alternative Designations: BM-21 GRAD (Hail) MRL Date of Introduction: 1963 Proliferation: At least 50 countries Description: Crew: 5 (8 with 9K51 Complex) Chassis/Carriage: Ural 375-D 6x6 wheeled Combat Weight (mt): 13.7 Chassis Length Overall (m): 7.35 Height Overall (m): 3.09 Width Overall (m): 2.40</p> <p>Automotive Performance: Engine Type: ZIL 375, 180 hp water-cooled, V-8 gasoline engine Cruising Range (km): 450 km Speed (km/h): Max Road: 75 Max Off-Road: 35 Cross-Country: INA Max Swim: N/A Fording Depths (m): Unprepared: 1.5 Emplacement Time (min): 3 Displacement Time (min): 2</p> <p>Radio: R-123M</p> <p>Protection: Armor, Front (mm): None Armor Side (mm): None Armor Roof (mm): None Self-Entrenching Blade: No NBC Protection System: No Smoke Equipment: No</p> <p>ARMAMENT Launcher: Caliber, Type, Name: 122-mm, 9P132 Number of Tubes: 40 (4 rows of 10 tubes) Launch Rate: Full Salvo Time: 40 rounds in 20 seconds Single Rocket Interval: .5 seconds per rocket Loader Type: Manual Reload Time: 10 minutes Launcher Drive: Electric Traverse: (°): Left: 102 Right: 70 Total: 172 Elevation (°) (-/+): - 0/+55°</p>	<p>FIRE CONTROL Indirect Fire: PG-1M Panoramic Telescope (PANTEL) Collimator: K-1 Fire Control Computer: None Position Location System: None</p> <p>VARIANTS BM-21V: Russian 12-tube version for airborne divisions BM-21B: Russian 36-tube MRL on a 6x6 ZIL-131 chassis Grad-P: Russian 1 round rocket launcher BM-11: North Korean 30-tube version Type 81: Chinese 40- rail-launched version RM-70: Czechoslovakian 40-tube version Sakr: Egyptian 40- tube version</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 122-mm Frag-HE, 9M22U Indirect Fire Range (m): Minimum Range: 5000 Maximum Range: 20,380 Warhead Weight (kg): 18.4 (M21OF) Rocket Length: (m): 2.87 Maximum Velocity: INA Fuze Type: MRV-U (PD)</p> <p>122-mm Frag-HE, 9M28F Indirect Fire Range (m): Minimum Range: 1500 Maximum Range: 15,000 Warhead Weight (kg): 21.0 Rocket Length: (m): 2.87 Maximum Velocity: INA Fuze Type: MRV-U (PD) or AR-6 (proximity)</p> <p>122-mm Frag-HE, Type 90A (Chinese) Indirect Fire Range (m): Minimum Range: 12,700 Maximum Range: 32,700 Warhead Weight (kg): 18.3 Rocket Length: (m): 2.75 Maximum Velocity: INA Fuze Type: PD</p> <p>Other Ammunition Types: Smoke, Incendiary, Chemical, RF Jammer, Illumination, Antitank mines, Antipersonnel mines</p>	

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The BM-21 is unquestionably the world's most widely used MRL. The launcher with supporting equipment is referred to as the complex 9K51. A special electric generator powers the launcher. The 9V170 firing device is cab mounted. But, the rockets can be fired using a remote-firing device that has a 64-meter-long cable.

Russian 220-mm Multiple Rocket Launcher 9P140

	<p>Weapons & Ammunition Types</p> <p>220-mm rocket</p> <p>Frag-HE</p>	<p>Typical Combat Load</p> <p>16</p>
<p>SYSTEM</p> <p>Alternative Designations: 9P140 Uragan</p> <p>Date of Introduction: 1977</p> <p>Proliferation: At least 7 countries</p> <p>Description:</p> <p>Crew: 4</p> <p>Chassis/Carriage: ZIL-135LM 8x8 wheeled</p> <p>Combat Weight (mt): 20.0</p> <p>Chassis Length Overall (m): 9.3</p> <p>Height Overall (m): 3.2</p> <p>Width Overall (m): 2.8</p> <p>Automotive Performance:</p> <p>Engine Type: 2 each - 177 hp, 8 cylinder, 4-stroke gasoline engines</p> <p>Cruising Range (km): 500 km</p> <p>Speed (km/h):</p> <ul style="list-style-type: none"> Max Road: 65 Max Off-Road: INA Cross-Country: INA Max Swim: N/A <p>Fording Depths (m): Unprepared: 1.2</p> <p>Emplacement Time (min): 3</p> <p>Displacement Time (min): 3</p> <p>Radio: R-123M</p> <p>Protection:</p> <ul style="list-style-type: none"> Armor, Front (mm): None Armor Side (mm): None Armor Roof (mm): None Self-Entrenching Blade: No NBC Protection System: No Smoke Equipment: No <p>ARMAMENT</p> <p>Launcher:</p> <p>Caliber, Type, Name: 220-mm, 9P140</p> <p>Number of Tubes: 16 (2 rows of 6 tubes and 1 row of 4 tubes)</p> <p>Launch Rate:</p> <ul style="list-style-type: none"> Full Salvo Time: 16 rounds in 20 seconds Single Rocket Interval: 1.25 seconds per rocket <p>Loader Type: Manual</p> <p>Reload Time: 15-20 minutes</p> <p>Launcher Drive: Electric</p> <p>Traverse (°):</p> <ul style="list-style-type: none"> Left: 30 Right: 30 Total: 60 <p>Elevation (°) (-/+): -0/+55°</p>	<p>FIRE CONTROL</p> <p>Indirect Fire: PG-1M Panoramic Telescope (PANTEL)</p> <p>Collimator: K-1</p> <p>Fire Control Computer: None</p> <p>Position Location System: None</p> <p>VARIANTS</p> <p>None</p> <p>MAIN ARMAMENT AMMUNITION</p> <p>Caliber, Type, Name:</p> <p>220-mm Frag-HE, 9M27F</p> <ul style="list-style-type: none"> Indirect Fire Range (m): <ul style="list-style-type: none"> Minimum Range: 10,000 Maximum Range: 35,000 Warhead Weight (kg): 100 Rocket Length (m): 4.8 Maximum Velocity: INA Fuze Type: Electronic timing (ET) <p>220-mm DPICM, 9M27K</p> <ul style="list-style-type: none"> Indirect Fire Range (m): <ul style="list-style-type: none"> Minimum Range: 10,000 Maximum Range: 35,000 Warhead Weight (kg): 90 Rocket Length (m): 5.1 Maximum Velocity: INA Fuze Type: Electronic timing (ET) <p>220-mm Antitank, 9M27K2</p> <ul style="list-style-type: none"> Indirect Fire Range (m): <ul style="list-style-type: none"> Minimum Range: 10,000 Maximum Range: 35,000 Warhead Weight (kg): 90 Rocket Length (m): 5.1 Maximum Velocity: INA Fuze Type: Electronic timing (ET) 	

Russian 220-mm Multiple Rocket Launcher 9P140 continued _____

<p>MAIN ARMAMENT AMMUNITION (continued) Caliber, Type, Name: 220-mm Antipersonnel, 9M27K3 Indirect Fire Range (m): Minimum Range: 10,000 Maximum Range: 35,000 Warhead Weight (kg): 90 Rocket Length: (m): 5.1 Maximum Velocity: INA Fuze Type: Electronic timing (ET)</p>	<p>220-mm Antitank, 9M59 Indirect Fire Range (m): Minimum Range: 10,000 Maximum Range: 35,000 Warhead Weight (kg): 90 Rocket Length: (m): 5.1 Maximum Velocity: INA Fuze Type: Electronic timing (ET)</p> <p>Other Ammunition Types: None</p>
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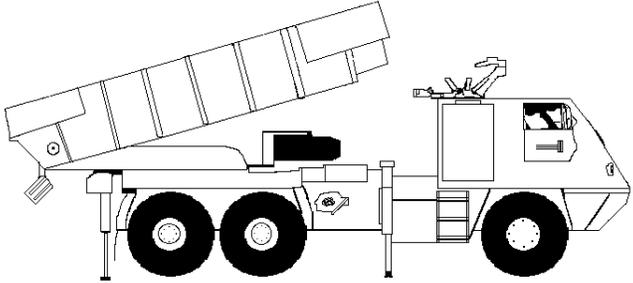
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The 9P140 Uragan (previously referred to incorrectly as BM-22 or BM-27) is the world's first modern fin and spin-stabilized heavy rocket system. Essentially a scaled-up version of the BM-21, the 9P140 use many of the same design features. The launcher, 9T452 transloader, rockets, and support equipment constitutes the 9K57 complex.

The 9P140 and its transloader are both based on variants of the gasoline-powered ZIL-135LM 8-ton 8x8 chassis. The truck is unusual in that it uses two engines, each driving the wheels on one side of the truck, and only the front and rear axles steer. The 9P140 cab has a blast shield that is raised during firing, and the vehicle is stabilized during firing by two manually emplaced hydraulic jacks at the rear of the chassis.

The launcher has electrically powered traversing and elevating mechanisms. During travel, the launcher assembly is oriented rearward and a light sheet metal cover over the muzzle end of the tubes prevents foreign material from entering the tube. This is a safety feature that is designed for travel when loaded. There is no such cover for the muzzle end of an unloaded launcher.

Brazilian 127-mm, 180-mm, & 300-mm Multiple Rocket Launcher ASTROS II _____

	<p>Weapons & Ammunition Types</p> <p>127-mm rocket Frag-HE</p> <p>180-mm rocket Frag-HE</p> <p>300-mm rocket Frag-HE</p> <p>.50 Cal. M2 HB MG</p>	<p>Typical Combat Load</p> <p>32</p> <p>16</p> <p>4</p> <p>INA</p>
<p>SYSTEM Alternative Designations: ASTROS II AV-LMU Date of Introduction: 1983 Proliferation: At least 6 countries Description: Crew: 3 Chassis/Carriage: TECTRAN 10-ton 6x6 wheeled Combat Weight (mt): 20.0 Chassis Length Overall (m): 8.0 Height Overall (m): 2.6 Width Overall (m): 2.4</p> <p>Automotive Performance: Engine Type: 280 hp, water-cooled turbocharged, diesel engine Cruising Range (km): INA Speed (km/h): Max Road: 70 Max Off-Road: 40 Cross-Country: INA Max Swim: N/A Fording Depths (m): Unprepared: 1.0 Emplacement Time (min): INA Displacement Time (min): INA</p> <p>Radio: INA</p> <p>Protection: Armor, Front (mm): None Armor Side (mm): None Armor Roof (mm): None Self-Entrenching Blade: No NBC Protection System: No Smoke Equipment: 6 smoke grenade launchers</p> <p>ARMAMENT Launcher: Caliber, Type, Name: 127-mm, 180-mm, 300-mm, ASTROS Number of Tubes: 127-mm (32), 180-mm (16), 300-mm (4) Launch Rate: Full Salvo Time: INA Single Rocket Interval: INA Loader Type: Manual Reload Time: INA Launcher Drive: Electric Traverse: (°): Left: INA Right: INA Total: INA Elevation (°) (-/+): INA</p>	<p>Auxiliary Weapon: Caliber, Type, Name: .50 (12.7x99) heavy machinegun, M2HB Mount Type: Cab AA mount Direct Fire Range (m): INA Max Effective Range (m): Day: 1000 Night: INA Fire on Move: Yes Rate of Fire (rpm): 450-550 (cyclic)</p> <p>FIRE CONTROL Indirect Fire: INA Collimator: INA Fire Control Computer: FIELDGAURD Radar or the FILA System Position Location System: INA</p> <p>VARIANTS: None</p> <p>MAIN ARMAMENT AMMUNITION Caliber, Type, Name: 127-mm Frag-HE, SS-30 Indirect Fire Range (m): Minimum Range: 9000 Maximum Range: 30,000 Warhead Weight (kg): INA Rocket Length: (m): 3.9 Maximum Velocity: INA Fuze Type: INA</p> <p>Other Ammunition Types: None</p> <p>Caliber, Type, Name: 180-mm Frag-HE, SS-40 Indirect Fire Range (m): Minimum Range: 15,000 Maximum Range: 35,000 Warhead Weight (kg): INA Rocket Length: (m): 4.2 Maximum Velocity: INA Fuze Type: INA</p> <p>Other Ammunition Types: DPICM, HE-Incendiary, Antitank mines, Antipersonnel mines, Runway Denial</p>	

Worldwide Equipment Guide

Brazilian 127-mm, 180-mm, & 300-mm Multiple Rocket Launcher ASTROS II continued

<p>Caliber, Type, Name: 300-mm Frag-HE, SS-60</p> <p>Indirect Fire Range (m): Minimum Range: 20,000 Maximum Range: 60,000</p> <p>Warhead Weight (kg): INA Rocket Length: (m): 5.6 Maximum Velocity: INA Fuze Type: INA</p> <p>Other Ammunition Types: DPICM, HE-Incendiary, Antitank mines, Antipersonnel mines, Runway Denial</p>	<p>300-mm Frag-HE, SS-80</p> <p>Indirect Fire Range (m): Minimum Range: 22,000 Maximum Range: 90,000</p> <p>Warhead Weight (kg): INA Rocket Length: (m): 5.6 Maximum Velocity: INA Fuze Type: INA</p> <p>Other Ammunition Types: DPICM, HE-Incendiary, Antitank mines, Antipersonnel mines, Runway Denial</p>
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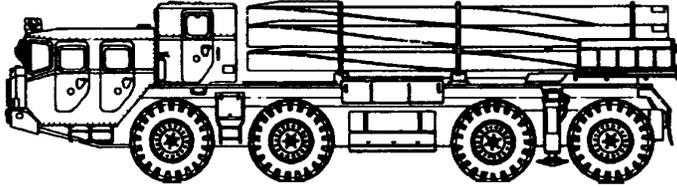
The ASTROS (Artillery SaTuration ROcket System) II is a modular multiple rocket launcher capable of firing three different caliber wrap-around fin rockets (for improved accuracy) using several types of warheads. The universal modules enable the system to accomplish fire missions with ranges from 9 to 90 kilometers.

The ASTROS II system consists of the following vehicles:

Universal Multiple Launcher (AV-LMU), Ammunition Supply Vehicle (AV-RMD), Command and Control Vehicle/Fire Control Unit (AV-VCC), Mobile Workshops (for field maintenance), and the Optional Electronic Fire Control Unit (AV-UCF). All of the ASTROS II vehicles use the Tectran Engenharia 10 ton, 6x6, wheeled vehicle chassis.

A typical firing battery consists of six AV-LMU launchers, six AV-RMD ammunition supply vehicles, and one AV-VCC fire control unit. A AV-VCC command and control unit and two mobile workshops are found at battalion level. The battalion level AV-VCC can coordinate and direct fire missions for three ASTROS batteries. The AV-RMD ammunition supply vehicle carries two complete loads for each launcher.

Russian 300-mm Multiple Rocket Launcher 9A52-2

	<p>Weapons & Ammunition Types</p> <p>300-mm rocket</p> <p>Frag-HE</p>	<p>Typical Combat Load</p> <p>12</p>
<p>SYSTEM</p> <p>Alternative Designations: 9A52-2 Smerch-M</p> <p>Date of Introduction: 1989</p> <p>Proliferation: At least 4 countries</p> <p>Description:</p> <p>Crew: 4 (7 with 9K58 Complex)</p> <p>Chassis/Carriage: MAZ-543M 8x8 wheeled</p> <p>Combat Weight (mt): 43.7</p> <p>Chassis Length Overall (m): 12.1</p> <p>Height Overall (m): 3.05</p> <p>Width Overall (m): 3.05</p> <p>Automotive Performance:</p> <p>Engine Type: 518 hp, V-12 diesel engine</p> <p>Cruising Range (km): 850 km</p> <p>Speed (km/h):</p> <ul style="list-style-type: none"> Max Road: 60 Max Off-Road: 35 Cross-Country: INA Max Swim: N/A <p>Fording Depths (m): Unprepared: 1.1</p> <p>Emplacement Time (min): 3</p> <p>Displacement Time (min): 3</p> <p>Radio: R-123M</p> <p>Protection:</p> <p>Armor, Front (mm): None</p> <p>Armor Side (mm): None</p> <p>Armor Roof (mm): None</p> <p>Self-Entrenching Blade: No</p> <p>NBC Protection System: No</p> <p>Smoke Equipment: No</p> <p>ARMAMENT</p> <p>Launcher:</p> <p>Caliber, Type, Name: 300-mm, 9A52</p> <p>Number of Tubes: 12 (3 rows of 4 tubes)</p> <p>Launch Rate:</p> <ul style="list-style-type: none"> Full Salvo Time: 12 rounds in 38 seconds Single Rocket Interval: 3 seconds per rocket <p>Loader Type: Manual</p> <p>Reload Time: 36 minutes</p> <p>Launcher Drive: Electric</p> <p>Traverse (°):</p> <ul style="list-style-type: none"> Left: 30 Right: 30 Total: 60 <p>Elevation (°) (-/+): -0/+55°</p>	<p>FIRE CONTROL</p> <p>Indirect Fire: PG-1M Panoramic Telescope (PANTEL)</p> <p>Collimator: K-1</p> <p>Fire Control Computer: None</p> <p>Position Location System: None</p> <p>VARIANTS</p> <p>None</p> <p>MAIN ARMAMENT AMMUNITION</p> <p>Caliber, Type, Name:</p> <p>300-mm Frag-HE, 9M55F</p> <ul style="list-style-type: none"> Indirect Fire Range (m): <ul style="list-style-type: none"> Minimum Range: 20,000 Maximum Range: 70,000 Warhead Weight (kg): 258 Rocket Length (m): 7.6 Maximum Velocity: INA Fuze Type: Electronic timing (ET) <p>300-mm DPICM, 9M55K</p> <ul style="list-style-type: none"> Indirect Fire Range (m): <ul style="list-style-type: none"> Minimum Range: 20,000 Maximum Range: 70,000 Warhead Weight (kg): 235 Rocket Length (m): 7.6 Maximum Velocity: INA Fuze Type: Electronic timing (ET) <p>300-mm Sensor-fuzed (MOTIV-3M), 9M55K1</p> <ul style="list-style-type: none"> Indirect Fire Range (m): <ul style="list-style-type: none"> Minimum Range: 20,000 Maximum Range: 70,000 Warhead Weight (kg): 233 Rocket Length (m): 7.6 Maximum Velocity: INA Fuze Type: Electronic timing (ET) <p>Other Ammunition Types: Smoke, Incendiary, Chemical, Leaflet, Fuel Air Explosive (FAE), R-90 expendable miniature UAV (experimental)</p>	

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The 9A52-2 launcher with all supporting equipment, including the 9T234-2 Transloader, and the 1K123 Vivary Fire Control System, is referred to as the complex 9K58.

Chapter 7 Air Defense

This chapter provides an overview of selected air defense systems either in use or readily available to an OPFOR. The selection of weapons is not intended to be all-inclusive, but rather a representative sampling of weapons and equipment supporting various OPFOR military capabilities.

This chapter is divided into three categories—*towed AA guns*, *self-propelled AA guns/combination guns* and *surface-to-air missiles (SAMs)*. *Towed AA guns* covers, in order, the KS-19M2 100-mm gun, S-60 57-mm gun and the ZU-23 23-mm gun. The next category, *self-propelled AA guns/combination guns*, contains the ZSU-23-4 23-mm gun and the 2S6 30-mm gun/missile system. The final category of *surface-to-air missiles (SAMs)* consists of the SA-7b, SA-8b, SA-14, SA-15b and the SA-18.

Tactical air defense is used to protect ground force units and other potential targets from attack by enemy fixed-wing aircraft and armed helicopters. Due to increases in performance and the sheer number of air defense systems, specifically manportable systems, the selected systems represent some of the most formidable threats to aircraft of all types.

Some trends in air defense development will become more widespread in the near future. These include the production of authorized and unauthorized copies of existing systems and the development of hybrid systems. The sensor package may consist of one or more radars, direct view optics, and electro-optics systems. The sensor package is the single most important aspect of air defense systems since these devices perform the surveillance and tracking functions. As the data classification permits, all attempts have been made to provide the user with as much information as possible in these areas. Radar systems have traditionally been the most popular sensor for air-defense systems, however, with the latest generation weapons they are usually supplemented with a variety of optic or electro-optic sensors such as; TV cameras, night vision sights, and laser rangefinders. As the trends become more defined and more information becomes available, updates to the systems will be produced.

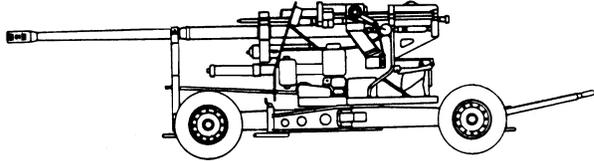
Questions and comments on data listed in this chapter should be addressed to:

Penny L. Mellies

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e-mail address: melliesp@leav-emh1.army.mil

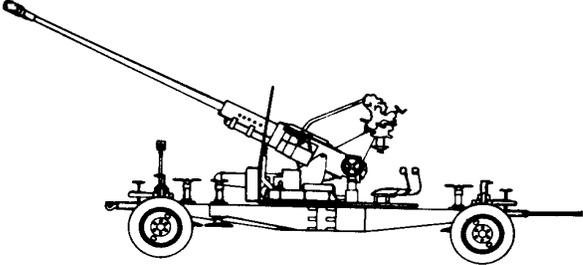
Russian 100-mm Towed AA Gun KS-19M2

	<p>Weapons & Ammunition Types</p> <p>100-mm gun</p> <p>Frag-HE AP-T APC-T</p>	<p>Typical Combat Load</p> <p>100</p>
<p>SYSTEM Alternative Designations: None Date of Introduction: 1949 Proliferation: At least 20 countries</p> <p>Description: Crew: 15 Carriage: Towed 2-axle, 4-wheel carriage Combat Weight (kg): 11,000 Length Overall (m): 9.3 Travel Position: 9.45 Firing Position: INA Length of Barrel (m): 5.74 Height (m): Overall: 2.2 Travel Position: INA Firing Position: 7.62 Width Overall (m): 2.32 Prime Mover: Towing vehicle AT-S or AT-T</p> <p>Automotive Performance: Max. Towed Speed (km/h): 35 Emplacement Time (min): 7 Displacement Time (min): 6</p>	<p>ARMAMENT Gun: Caliber, Type: 100-mm gun Number of Barrels: 1 Service Life of Barrel (rds): 2,800 Rate of Fire(rd/min): Maximum: INA Practical: 10-15 Loader Type: Manual Reload Time (min): INA Traverse (°): 360 Traverse Rate (°/sec): 20 Elevation (°) (-/+): -3 to 89 Elevation Rate (°/sec): 12 Reaction time (sec): 30</p> <p>FIRE CONTROL On-carriage: PO-1M telescope Field of View (°): 14 Power: 5x PG panoramic telescope: Field of View (°): 10 Power: 4x Off-carriage: Rangefinder: D-49 (off carriage) Radar: Name: SON-9/SON-9A (FIRE CAN) Function: Fire Control Detection Range (km): 80 Tracking Range (km): 35 Frequency: 2.7-2.9 GHz Frequency Band: E Peak Power (kW): 300 PUAZO 6-19 or 6-19M fire control director</p>	<p>VARIANTS Type 59: Chinese variant.</p> <p>MAIN ARMAMENT AMMUNITION Types: Frag-HE, AP-T, APC-T Range (m): With on-carriage sight: 4,000 With off-carriage radar: 12,600 Projectile Weight (kg): Frag-HE: 15.61 AP-T: 15.89 APC-T: 16 Muzzle Velocity (m/s): 900-1,000 Fuze Type: Proximity and Time Self-Destruct (sec): 30</p>

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The KS-19M2 may also be employed in a ground support role.

Russian 57-mm Towed AA Gun S-60

	<p align="center">Weapons & Ammunition Types</p> <p>57-mm gun</p> <p>FRAG-T APC-T</p>	<p align="center">Typical Combat Load</p> <p align="right">200</p>
<p>SYSTEM Alternative Designations: None Date of Introduction: 1950 Proliferation: At least 46 countries</p> <p>Description: Crew: 7 Carriage: Four-wheel Weight (kg): 4,500 Length Overall (m): Travel Position: 8.50 Firing Position: 8.84 Length of Barrel (m): 4.39 Height (m): Overall: Travel Position: 2.37 Firing Position: 6.02 Width Overall (m): Travel Position: 2.08 Firing Position: 6.9 Prime Mover: Ural-375D</p> <p>Automotive Performance: Max. Towed Speed (km/h): 60 Emplacement Time (min): 1 Displacement Time (min): 3</p>	<p>ARMAMENT Gun: Caliber, Type: 57-mm automatic cannon Number of Barrels: 1 each Service Life of Barrel (rds): INA Rate of Fire (rd/min): Cyclic: 105-120 Practical: 70 Loader Type: 4 rd clip, manual Reload Time (sec): 4-8 Traverse (°): 360 Traverse Rate (°/sec): 40 Elevation (°) (-/+): -4 to +87 Elevation Rate (°/sec): 34 Reaction time (sec): 4.5</p> <p>FIRE CONTROL On-carriage: Optical mechanical computing sight AZP-57: Target Range (m): 5,500 Direct fire telescope</p> <p>Off-carriage: (see NOTES) Rangefinder: D-49 Radar: Name: SON-9/SO-9A Function: Fire Control Detection Range (km): 80 Tracking Range (km): 35 Frequency: 2.7-2.9 GHz Frequency Band: E Peak Power (kW): 300 PUAZO 6-60 fire control director</p>	<p>VARIANTS Type 59: Chinese variant SZ-60: Hungarian license-built variant</p> <p>MAIN ARMAMENT AMMUNITION Type: FRAG-T, APC-T Range (m): With on-carriage sight: 4,000 With off-carriage radar: 6,000 Projectile Weight (kg): FRAG-T: 2.81 APC-T: 2.82 Muzzle Velocity (m/s): 1,000 Fuze Type: FRAG-T: Point detonating APC-T: Base detonating Self-Destruct (sec): 13-17</p>

NOTES

Some versions may have the FLAP WHEEL as the primary fire control radar. A S-60 battery will generally consist of six guns, a fire-control radar, and a fire-control director. Four-round clips feed ammunition horizontally into weapon. The S-60 also has an ammunition ready rack that can hold 4 four-round clips near ammunition feed mechanism on left side of the breech. The S-60 can also be used in a ground support role.

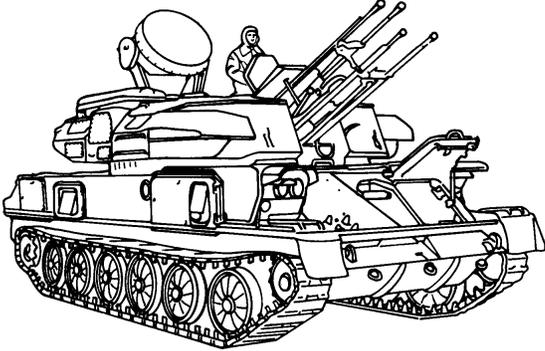
Russian 23-mm Towed AA Gun ZU-23

		<p>Weapons & Ammunition Types</p> <p>2 x 23-mm AA guns</p> <p>HE-I HEI-T API-T TP</p>	<p>Typical Combat Load</p> <p>2,400</p>
<p>SYSTEM Alternative Designation: None Date of Introduction: 1962 Proliferation: At least 50 countries</p> <p>Description: Crew: 5 Carriage: Two-wheeled Combat Weight (kg): 950 Length Overall (m): Travel Position: 4.57 Firing Position: 4.60 Length of Barrel (m): 2.01 Height (m): Overall: Travel Position: 1.87 Firing Position: 1.28 Width Overall (m): Travel Position: 1.83 Firing Position: 2.41 Prime Movers: GAZ-69 4 x 4 truck, MTLB-T, BMD-2</p> <p>Automotive Performance: Max. Towed Speed (km/h): 70 Emplacement Time (sec): 15-20 Displacement Time (sec): 35-40</p>	<p>ARMAMENT Gun: Caliber, Type: 23-mm, gas-operated gun Number of Barrels: 2 Breech Mechanism: Vertical Sliding Wedge Rate of Fire (rd/min): Cyclic: 800-1,000 Practical: 200 Feed: 50-rd ammunition canisters fitted on either side of the upper mount assembly Loader Type: Magazine Reload Time (sec): 15 Traverse (°): 360 Traverse Rate (°/sec): INA Elevation (°) (-/+): -10° to +90° Elevation Rate (°/sec): 54 Reaction Time (min): 8 (est.)</p> <p>FIRE CONTROL Sights w/magnification: Optical mechanical sight for AA fire Straight tube telescope for ground targets</p>	<p>VARIANTS ZU-23M: Egyptian produced ZU-23, also referred to as the SH-23M.</p> <p>MAIN ARMAMENT AMMUNITION Type: HE-I, HEI-T, API-T, TP Range (m): Max. Range: 2,500 Min. Range: INA Altitude (m): Max. Altitude: 1,500 Min. Altitude: INA Projectile Weight (kg): HE-I: 0.18 HEI-T: 0.19 API-T: 0.189 TP: 0.18 Muzzle Velocity (m/s): 970 Fuze Type: HE-I: Point detonating HEI-T: Point detonating API-T: Base detonating TP: Dummy Self-Destruct (sec): 8</p>	

NOTES

Highly mobile air dropable system. Fires the same ammunition as the ZSU-23-4. The reload time will depend on the proficiency of the crew to manually reload. Can fire from the traveling position in emergencies. The ZU-23 can also be used in a ground support role.

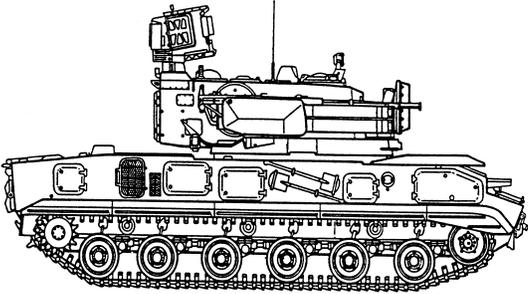
Russian 23-mm SP AA Gun ZSU-23-4

	<p align="center">Weapons & Ammunition Types</p> <p>4x 23-mm AA guns</p> <p>HE-I HEI-T API-T</p>	<p align="center">Typical Combat Load</p> <p align="center">2,000</p>
	<p>SYSTEM Alternative Designation: Shilka Date of Introduction: 1965 Proliferation: At least 28 countries</p> <p>Description: Crew: 4 Combat Weight (mt): 20.5 Chassis: GM-575 Tracked, six road wheels, no track support rollers Length (m): 6.5 Height (m): Radar up: 3.75 Radar down: 2.60 Width (m): 3.1</p> <p>Automotive Performance: Engine Type: V6R-1 diesel Cruising Range (km): 450 Speed (km/h): Max. Road: 50</p> <p>Radio: R-123</p> <p>Protection: NBC Protection System: Yes</p>	<p>ARMAMENT Gun: Caliber, Type, Name: 23-mm liquid-cooled AA 2A7/2A7M Rate of Fire(rd/min): Practical: INA Cyclic: 850-1,000 Reload Time (min): 20 Elevation (°) (-/+):-4° to +85° Fire on Move: Yes Reaction Time (sec): 12-18</p> <p>FIRE CONTROL Sights w/magnification: Day and night vision devices: Driver periscope: BMO-190 Driver IR periscope: INA Commander periscope: TPKU-2 Commander IR periscope: TKH-ITC IFF: INA</p> <p>Radar: 1RL33M1 Name: GUN DISH Function: Search and Tracking Detection Range (km): 20 Tracking Range (km): 10 Frequency: 14.8 to 15.6 GHz Frequency Band: J</p> <p>Optical-mechanical computing sight: Part of fire-control subsystem designated as RPK-2</p>

NOTES

Ammunition is normally loaded with a ratio of three HE rounds to one AP round. ZSU 23-4 Shilka, is capable of acquiring, tracking and engaging low-flying aircraft (as well as mobile ground targets while either in place or on the move). Resupply vehicles carry an estimated additional 3,000 rounds for each of the four ZSUs in a typical battery. Recent (October 1997) information details ZSU-23-4 updates/modernization being offered by the Ukrainians that include: a new radar system replacing the GUN DISH radar, plus a sensor pod believed to include day/night camera, and a laser rangefinder; and mounted above radar/sensor pod is a layer of six fire-and-forget SAMs, believed to be Russian SA-18/GROUSE.

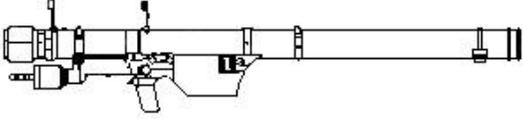
Russian 30-mm SP AA Gun/Missile System 2S6M

	<p>Weapons & Ammunition Types</p> <p>2 x 30-mm twin barrel cannons</p> <p>AP-T Frag-T HE-I</p> <p>SA-19/GRISON</p>	<p>Typical Combat Load</p> <p>1,904</p> <p>8</p>
<p>SYSTEM Alternative Designations: 2K22M, Tunguska-M Date of Introduction: 1990 Proliferation: At least 2 countries</p> <p>Description: Crew: 4 Combat Weight (mt): 34 Chassis: GM-352M tracked vehicle Chassis Length Overall (m): 7.93 Height (m): TAR up: 4.02 TAR down: 3.36 Width Overall (m): 3.24</p> <p>Automotive Performance: Engine Type: V-12 turbo diesel Cruising Range (km): 500 Speed (km/h): Max. Road: 65 Max. Swim: INA Fording Depths (m): INA</p> <p>Radio: R-173</p> <p>Protection: NBC Protection System: Yes</p>	<p>ARMAMENT Gun: Caliber, Type, Name: 30-mm gun, 2A38M Rate of Fire (rd/min): 4,800 (four gun total) Reload Time (min): gun ammunition and missiles in about 16 min. Elevation (°) (-/+): -10 to + 87° Fire on Move: Yes</p> <p>Missile: 9M311 Name: SA-19/GRISON Range (m): Max. Range: 8,000-10,000 (see NOTES) Min. Range: 2,500 Altitude (m): Max. Altitude: 3,500 Min. Altitude: 15 Dimensions: Length (m): 2.83 Weight (kg): 57 (in container) Missile Speed (m/s): 600-900 Guidance: SACLOS Seeker Field of View(°): INA Tracking Rate: INA Warhead Type: Frag-HE Warhead Weight (kg): 9 Fuze Type: Proximity Self-Destruct (sec): INA System Reaction Time (sec): 6-12 Fire on Move: No (must be at a halt to fire the missile)</p>	<p>FIRE CONTROL Sights w/magnification: Stabilized optical sight 1A29M Magnification: 8x Field of View(°): 8° Commander's position IR day/night sight IFF: Yes</p> <p>Radars: HOT SHOT radar system Name: 1RL144 (TAR) Function: Target Acquisition Detection Range (km): 18-20 Tracking Range (km): INA Frequency: 2-3 GHz Frequency Band: E</p> <p>Name: 1RL144M (TTR) Function: Target Tracking Detection Range (km): 16 Tracking Range (km): INA Frequency: 10-20 GHz Frequency Band: J</p> <p>VARIANTS (see NOTES)</p> <p>MAIN ARMAMENT AMMUNITION Type: AP-T, Frag-T, HE-I Range (m): Max. Range: 4,000 Min. Range: 200 Altitude (m): Max. Altitude: 3,000 Min. Altitude: 0 Projectile Weight (kg): INA</p>

NOTES

Range out to 10 km for hovering aircraft and low flying targets. In addition to the 8 mounted ready missiles two additional missiles can be carried inside. There is a 2S6M1 variant/upgrade, which has improved missile control, range and altitude capabilities of 1.5-10 km, and 0.015-6 km respectively. However, as of November 1997 the 2S6M1 is not known to be fielded.

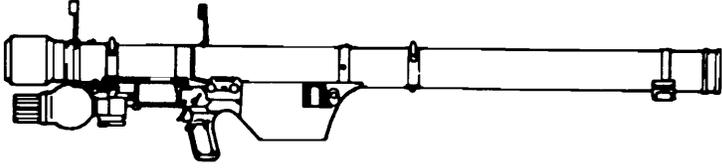
Russian Manportable SAM System SA-7b/GRAIL

	<p>Weapons & Ammunition Types</p> <p>ready missile</p>	<p>Typical Combat Load</p> <p>1</p>
<p>SYSTEM Alternative Designation: 9K32M Strela-2M Date of Introduction: 1972 Proliferation: Worldwide</p> <p>Description: Crew: 1</p>	<p>ARMAMENT Launcher Name: 9P54M Dimensions: Length (m): 1.47 Diameter (mm): 70 Weight (kg): 4.71 Reaction Time (acquisition to fire) (sec): 5-10 Time Between Launches (sec): INA Reload Time (sec): 6-10</p> <p>Missile Name: 9M32M Range (m): Max. Range: 5,500 Min. Range: 500 Altitude (m): Max. Altitude: 4,500 Min. Altitude: 18 Dimensions: Length (m): 1.40 Diameter (mm): 70 Weight (kg): 9.97 Missile Speed (m/s): 580 Propulsion: Solid fuel booster and solid fuel sustainer rocket motor. Guidance: Passive IR homing device (operating in the medium IR range) Seeker Field of View(°): 1.9° Tracking Rate(°/sec): 6° Warhead Type: HE Warhead Weight (kg): 1.15 Fuze Type: Contact (flush or grazing) Self-Destruct (sec): 15</p>	<p>FIRE CONTROL Sights w/Magnification: Launcher has sighting device and a target acquisition indicator. The gunner visually identifies and acquires the target. Gunner: Field of View (°): INA Acquisition Range (m): INA</p> <p>IFF: Yes (see NOTES)</p> <p>VARIANTS SA-N-5: Naval version HN-5A: Chinese version Strela 2M/A: Yugoslavian upgrade Sakr Eye: Egyptian upgrade</p> <p>Mounted in several types of vehicles in four, six, and eight-tube launcher varieties. Can be mounted on several helicopters (Mi-24, S-342 Gazelle)</p>

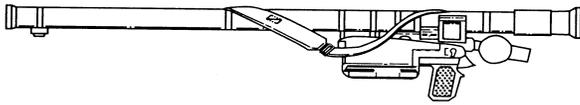
NOTES

The seeker is fitted with a filter to reduce the effectiveness of decoying flares and to block IR emissions. This missile is a tail-chasing heat (IR) seeker that depends on its ability to lock on to heat sources of usually low-flying fixed- and rotary-wing aircraft. An identification friend or foe (IFF) system can be fitted to the gunner/operator's helmet. Further, a supplementary early warning system consisting of a passive RF antenna and headphones can be used to provide early cue about the approach and rough direction of an enemy aircraft. The main difference between the SA-7 and SA-7b is the improved propulsion of the SA-7b. This improvement increases the speed and range of the newer version.

Russian Manportable SAM System SA-14/GREMLIN

	<p>Weapons & Ammunition Types</p> <p>ready missiles</p>	<p>Typical Combat Load</p> <p>1</p>
	<p>SYSTEM Alternative Designation: 9K34 Strela-3 Date of Introduction: 1978 Proliferation: Worldwide</p> <p>Description: Crew: 1</p>	<p>ARMAMENT</p> <p>Launcher Name: 9P59 Dimensions: Length (m): 1.40 Diameter (mm): 75 Weight (kg): 2.95 Reaction Time (sec): 14 Time Between Launches (sec): 35-40 Reload Time (sec): 25</p> <p>Missile Name: 9M36 or 9M36-1 Range (m): Max. Range: 6,000 Min. Range: 600 Altitude (m): Max. Altitude: 6,000 Min. Altitude: 50 Dimensions: Length (m): 1.4 m Diameter (mm): 75 mm Fin Span (mm): INA Weight (kg): 10.3 Missile Speed (m/s): 600 Propulsion: 2-stage solid-propellant rocket Guidance: passive IR homing Seeker Field of View: INA Tracking Rate: INA Warhead Type: Frag-HE Warhead Weight (kg): 1.0 Fuze Type: Contact/grazing Self-Destruct (sec): 14-17</p>

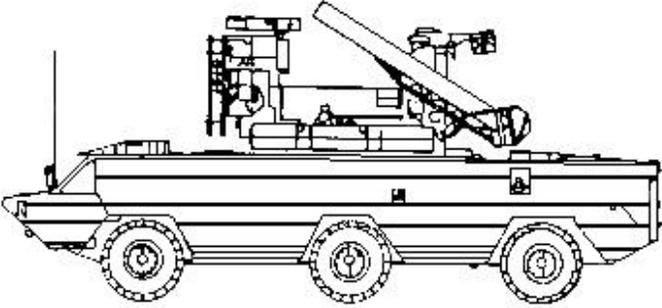
Russian Manportable SAM System SA-18/GROUSE

		<p>Weapons & Ammunition Types</p> <p>ready missiles</p>	<p>Typical Combat Load</p> <p>1</p>
<p>SYSTEM Alternative Designation: 9K38 Igla Date of Introduction: 1983 Proliferation: At least 4 countries</p> <p>Description: Crew: 1</p>	<p>ARMAMENT</p> <p>Launcher Name: 9P39 Dimensions (m): Length: 1.708 Diameter: INA Weight (kg): 1.63 Reaction Time (sec): 6-7 Time Between Launches (sec): 16 Reload Time (sec): 10</p> <p>Missile Name: 9M39 Range (m): Max. Range: 6,000 Min. Range: 500 Altitude (m): Max. Altitude: 3,500 Min. Altitude: 10 Dimensions (mm): Length: 1708 Diameter: 70 Weight (kg): 10.6 Missile Speed: Mach 2 Propulsion: Solid fuel booster and dual-thrust solid fuel sustainer rocket motor. Guidance: Passive IR homing Seeker Field of View: INA Tracking Rate: INA Warhead Type: HE Warhead Weight (kg): 1.27 Fuze Type: Contact Self-Destruct (sec): 15</p>	<p>FIRE CONTROL Sights w/Magnification: Launcher has fore and rear sights Gunner: Field of View (°): INA Acquisition Range (m): INA</p> <p>IFF: Yes</p> <p>VARIANTS Igla-V: Air-to-air version Igla-D: Use in airborne forces Igla-N: Increased lethality Igla-S: Improved version of Igla-N</p>	

NOTES

The SAM gunner is provided information about location and direction of approaching target(s) using a portable electronic plotting board. Two variants (Igla-D and Igla-N) can be separated in two parts for easier portability, but this adds 60 seconds to the reaction time. Igla-N is heavier due primarily to the warhead mass increased to 3.5 kg.

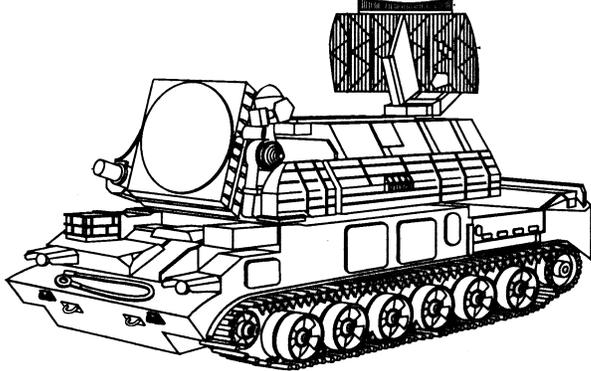
Russian SAM System SA-8b/GECKO

	<p>Weapons & Ammunition Types</p> <p>SA-8b in canisters</p>	<p>Typical Combat Load</p> <p>6</p>
<p>SYSTEM Alternative Designations: 9K33M3 Osa-AKM Date of Introduction: 1980 Proliferation: At least 25 countries</p> <p>Description: Crew: 3 Combat Weight (mt): 9 TELAR: BAZ-5937 6x6 amphibious cross-country capable vehicle Length (m): 9.14 Height (m): 4.2 (with surveillance radar folded down) Width (m): 2.75</p> <p>Automotive Performance: Engine Type: D20K300 diesel Cruising Range (km): 500 Speed (km/h): Max. Road: 80 Max. Swim: 8</p> <p>Radio: R-123M</p> <p>Protection: NBC Protection System: Yes</p>	<p>ARMAMENT Launcher: Name: 9P35M2 Dimensions: Length (m): 3.2 Diameter (mm): INA Weight (kg): 35 Reaction Time (sec): INA Time Between Launches (sec): 4 Reload Time (min): 5 Fire on Move: No Emplacement Time (min): 4 Displacement Time (min): Less than 4 (est.)</p> <p>Missile: Name: 9M33M3 Range (m): Max. Range: 15,000 Min. Range: 200 Altitude (m): Max. Altitude: 12,000 Min. Altitude: 10 Dimensions (mm): Length: 3158 Diameter: 209.6 Weight (kg): 170 Missile Speed (m/s): 1020 Propulsion: Solid propellant rocket motor Guidance: RF CLOS Warhead Type: Frag-HE Fuze Type: Contact and proximity Warhead Weight (kg): 16 Self-Destruct (sec): 25-28</p>	<p>FIRE CONTROL Sights w/Magnification: INA LLLTV/optical assist (for target tracking in low visibility and heavy ECM)</p> <p>IFF: Yes</p> <p>Radar: Name: LAND ROLL Function: Target Acquisition Detection Range (km): 20-30 Tracking Range (km): 20-25 Frequency: 6-8 GHz Frequency Band: H</p> <p>Radar: Name: Monopulse Target Tracking Radar Function: Target Tracking Detection Range (km): 20-25 Tracking Range (km): INA Frequency: 14.2-14.8 GHz Frequency Band: J</p> <p>2 Missile tracking radars: Frequency: 10-20 GHz</p> <p>VARIANTS SA-8a: Initial production model that carries four missiles on exposed rails. 4K33 Osa-M (SA-N-4): Naval variant</p>

NOTES

The first production version of this system was identified as SA-8a, which only had 4 launcher rails and exposed missiles. The SA-8b typically has two BAZ-5937 resupply/transloader vehicles, carrying 18 missiles each (boxed in sets of three) that supports a battery of four TELARs. A target can be brought under fire both with one missile as well as a volley of two missiles. This system is also air transportable.

Russian SAM System SA-15b/GAUNTLET

	<p>Weapons & Ammunition Types</p> <p>ready missiles</p>	<p>Typical Combat Load</p> <p>8</p>
<p>SYSTEM Alternative Designations: 9K331 Tor-M1 Date of Introduction: 1990 Proliferation: At least 5 countries</p> <p>Description: Crew: 3 TLAR: 9A331 combat vehicle Chassis: GM-355 Combat Weight (mt): 34 Length (m): 7.5 Height (m): 5.1 (TAR up) Width (m): 3.3</p> <p>Automotive Performance: Engine Type: V-12 diesel Cruising Range (km): 500 Speed (km/h): Max. Road: 65</p> <p>Radio: INA</p> <p>Protection: NBC Protection System: Yes</p>	<p>ARMAMENT Launcher: Name: INA Dimensions: INA Length (m): INA Diameter (mm): INA Weight (kg): INA Reaction Time (sec): 5-8 Time Between Launches (sec): (see NOTE) Reload Time (min): 10 Fire on Move: Yes Emplacement Time (min): 5 Displacement Time (min): Less than 5</p> <p>Missile: Name: 9M331 Range (m): Max. Range: 12,000 Min. Range: 100 Altitude (m): Max. Altitude: 6,000 Min. Altitude: 10 Dimensions (mm): Length: 2,900 Diameter: 235 Weight (kg): 167 Missile Speed (m/s): 850 Propulsion: INA Guidance: Command Warhead Type: Frag-HE Fuze Type: RF Proximity Warhead Weight (kg): 15 Self-Destruct (sec): INA</p>	<p>FIRE CONTROL Sights w/Magnification: Electro-optical (EO) television system: Range: 20 km</p> <p>IFF: Yes</p> <p>Radar: Name: INA Function: Target Acquisition Detection Range (km): 25 Tracking Range (km): INA Frequency: INA Frequency Band: H-band Doppler</p> <p>Radar: Name: INA Function: Target Tracking and Guidance Detection Range (km): INA Tracking Range (km): 25 Frequency: INA Frequency Band: K-band Doppler, Phased Array</p> <p>VARIANTS SA-N-9: Naval version</p>

NOTES

SA-15b is designed to be a completely autonomous air defense system (at division level), capable of surveillance, command and control, missile launch and guidance functions from a single vehicle. The basic combat formation is the firing battery consisting of four TLARs and the Rangir battery command post. The TLAR carries eight ready missiles stored in two containers holding four missiles each. The SA-15b has the capability to automatically track and destroy 2 targets simultaneously in any weather and at any time of the day.

Chapter 8 Engineer and Logistics

This chapter provides the basic characteristics of selected *engineer equipment* and *logistics vehicles*. *Engineer equipment* covers, in order, obstacle- and route-clearing vehicles, mine-laying systems, and mineclearing systems. It does not include engineer equipment designed primarily for civil engineering or construction in the rear areas. Also not included is dredging and gap crossing equipment. Data sheets addressing some of these systems will be sent with the next supplement to this guide.

The second category—*logistics vehicles*, provides the basic characteristics of selected trucks readily available to the OPFOR. It includes a representative vehicle from the light, utility, medium, and heavy truck categories. Later updates of this guide will include data on a wider selection of trucks, trailers, vans and other logistical equipment.

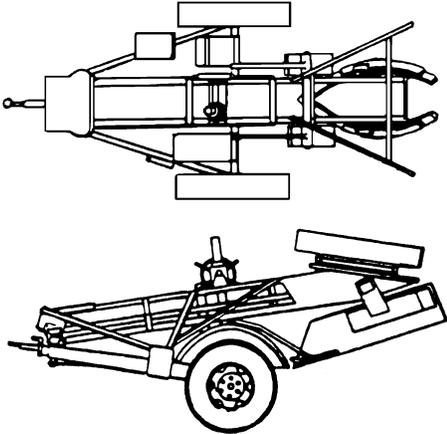
Questions and comments on data listed in this chapter should be addressed to:

Mr. Richard G. McCall

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e-mail address: mcallr@leav-emh1.army.mil

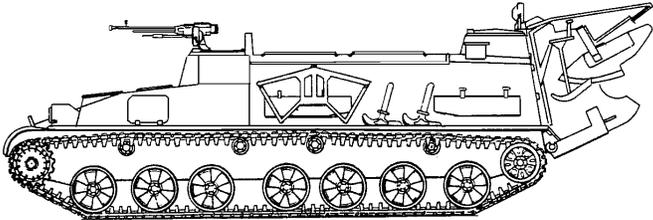
Russian Towed Mechanical Minelayer PMR-3

	<p>Mine Types</p> <p>Mines</p> <ul style="list-style-type: none"> TM-44 TM-46 TM-57 TM-62 Series TM-72 TMD-B 	<p>Typical Combat Load</p> <p>(varies, see Prime Mover)</p>
<p>SYSTEM</p> <p>Alternative Designations: INA Date Of Introduction: INA Proliferation: At least 17 countries</p> <p>Description: Crew: 6 (commander, driver, four operators) Weight (mt): 1.3 Length (m): 5.6 Height (m): 2.7 Width (m): 2</p> <p>Prime Mover: 6x6 ZIL-131 truck (200 mines) or 4x4 URAL-375D (350 mines) or BTR-152 (120 mines)</p>	<p>MINELAYING EQUIPMENT</p> <p>Operating Speed (km/h): Burying: 2 to 3 Surface Laying: 4 to 10 In Snow: INA</p> <p>Minelaying Rate (min): 10 to 12 Minelaying Pattern: Straight line Mine Spacing (m): 3 to 4 Mine Capacity: Prime-mover dependent Max Burial Depth (cm): 20</p> <p>VARIANTS</p> <p>PMZ-4: Lays controlled minefields; uses the same mines as the PMR-3 with the exception of the controllable minefield and cable-laying options; uses the UMP-2 Controlled AT Minefield Set</p>	

NOTES

The PMR-3, shown above, (and the similar PMZ-4) consists of a single chute and a plow attachment. Although both systems look similar at first glance, there are significant differences. Most notably, is the addition of a cable layer on the PMZ-4, used for the laying controlled minefields and the absence of the conveyer-belt chain drive on the wheels. Additionally, the PMZ-4 is more automated and must be hand loaded only. The towed-minelayers are used in sections of three or four and operate 20 to 40 meters apart with each minelayer laying a straight-line row. The mines in different rows are staggered with the distance between mines depending on whether the mines are pressure-initiated or full-width attack (influenced or tiltrod fuzed).

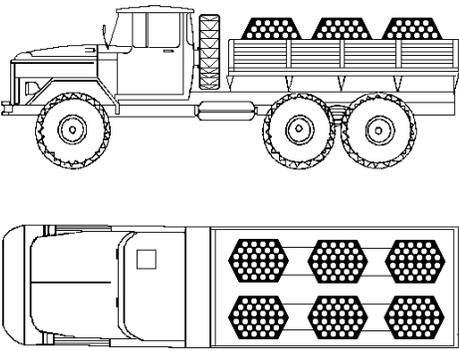
Russian Tracked Minelaying Vehicle GMZ-3

	<p>Mine Types</p> <p>Mines</p> <ul style="list-style-type: none"> TM-57 w/fuze MVZ-57 TM-62 series w/fuzes TM-46 TMD-B MV4-62 MVP-62 & w/prox fuze MVN-80 <p>7.62-mm PKT MG</p>	<p>Typical Combat Load</p> <p>208</p> <p>3,000</p>
<p>SYSTEM</p> <p>Alternative Designations: INA Date of Introduction: GMZ series-1963 Proliferation: Former Soviet Union</p> <p>Description: Crew: 3 (see NOTES) Chassis: Based on the SA-4 (GANEF) SAM Weight (mt): 28.5 Length (m): 8.62 Height (m): 2.7 Width (m): 3.25 Ground Clearance (mm): 470 Gradient (°): 30 Fording Depth (m): 1 Vertical Step (m): .7</p> <p>AUTOMOTIVE</p> <p>Engine: 4 cyl, 513 hp, multi-fuel diesel Cruising Range (km): 500 Speed (km/h): On Road: 60 Off Road: 30 Fuel Capacity (liters): INA Night Driving Equipment: Yes, TVNE-4B for the driver and K-3A for the vehicle commander (and PKT) Navigation Equipment: (see NOTES) Radio: R-123 NBC Protection System: Yes Smoke Screening System: VEES, plus 6 81-mm launchers, 3 on each side.</p>	<p>MINELAYING EQUIPMENT</p> <p>Operating Speed (km/h): Burying: 6 Surface Laying: 16 In Snow: 10 Minelaying Pattern: Straight line or staggered Mine Spacing (m): 5 and 10 Burial Depth (mm): Ground: 120 Snow: 500 Length of Single-row Minefield (m): Percussion Fuzes: 1,000 Proximity Fuzes: 2,000 Mine Capacity: 208 Mine Weight (kg): up to 12 Time Required to Load Minelayer with One Basic Mine Load (min) (7 men): 15 to 20 Men required to Load Minelayer with Mines: 7 (squad) Time Required to Load Minelayer with Crew Only (m): 60 Time from Travel to Operating Position (min): Automatic: Up to 2 Manual: Up to 8</p> <p>ARMAMENT</p> <p>Some GMZ may be armed with either the 12.7 or the 14.5 machineguns.</p> <p>Main Armament: Caliber, Type, Name: 7.62-mm PKT MG Mount Type: Cupola (GMZ-3) Max Effective Range (m): Day: 2,000 Night: INA Fire on Move: Yes Rate of Fire (rd/min): Practical: 250 Cyclic: 650</p> <p>VARIANTS</p> <p>GMZ: (shown above) GMZ-2: (see NOTES)</p>	

NOTES

The crew of the GMZ-3 consists of three people—the vehicle commander, driver-mechanic, and the minelayer operator. The commander and driver are located in the forward section while the operator compartment is located in the rear portion of the vehicle. The vehicle commander operates the 7.62-mm PKT machinegun. The GMZ-3 has a digital navigation system allowing precise topographic tie-in of the minefield being laid. The previous model minelayer (GMZ-2) was not designed for the employment of mines with proximity fuzes.

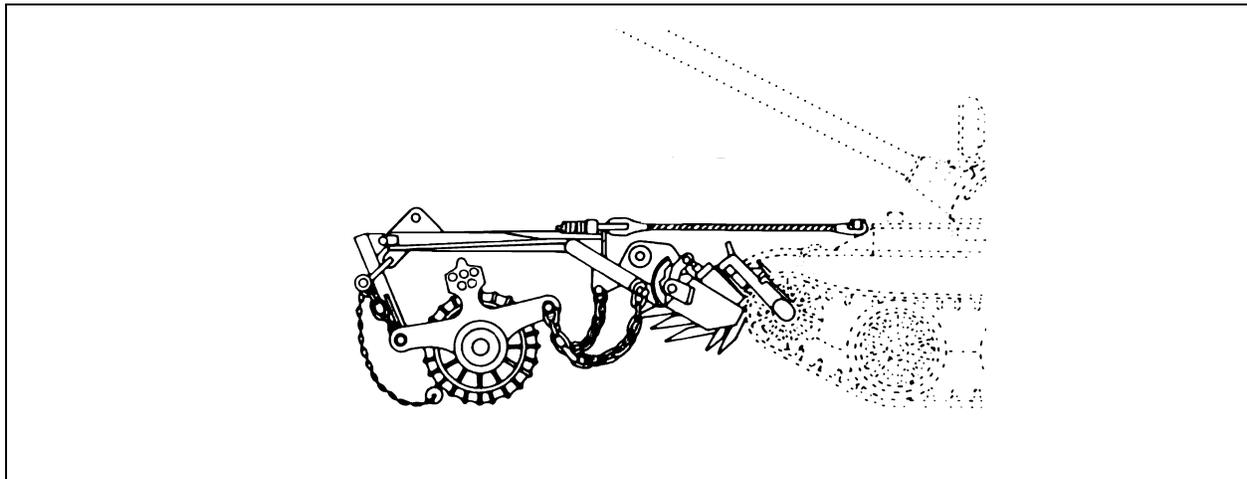
Russian Scatterable Minelaying System UMZ

	<p>Mine Types</p> <p>Mines</p> <ul style="list-style-type: none"> PFM-1 PFM-1/S POM-1 (S) POM-2S PTM-1S (PGMDM) PTM-3 	<p>Typical Combat Load</p> <p>(varies with type of mine—see below)</p>
<p>SYSTEM</p> <p>Alternative Designations: Multipurpose Minelayer Date of Introduction: INA Proliferation: Former Soviet Union</p> <p>Description: Crew: 2 (driver and operator) Chassis: ZIL-131 Truck (see VARIANTS) Weight (mt): Without Mine Load: 8.3 With Mine Load: 10 Length (m): 7.1 Height (m): 2.5 Width (m): 3 Ground Clearance (mm): 330</p> <p>AUTOMOTIVE</p> <p>Engine: V8, 150 hp, gas Cooling: Water Cruising Range (km): 525 Speed (km/h): 80 Gradient (°): 30 Fording Depth (m): 1.4 Vertical Step (m): .53 Night Vision Equipment: Yes, PNV-57E Navigation Equipment: INA Radio: R-159</p>	<p>MINELAYING EQUIPMENT</p> <p>Operating Speed (km/h): 10 to 40 Distance Mines Launched from Vehicle (m): 30-60 Minefield (m): Length: 1,000 to 1,200 Depth: 30 to 120 Max Length of Minefield with One Basic Load (m): AP, PFM-1S: 3,200 AP, POM-2: 5,000 AT, PTM-3: 600 Length of Triple-Row Minefield (m): 150 to 1,500 depending on mine type Mine Capacity: From 180 to 11,520 depending on the type of mine Number of Mines in One Basic Load: AP, PFM-1S: 11,520 AP, POM-2: 720 AT, PTM-3: 180 Time Required to Load Minelayer (hr) (2 men): 1.5 to 2 Time from Travel to Operating Position (min): 5</p> <p>VARIANTS Although primarily mounted on the ZIL-131, the UMZ minelaying system has been observed mounted on several different carriers such as a modified MTLB-U chassis or on a PT-S tracked amphibious personnel carrier.</p>	

NOTES

While the UMZ, scatterable, mine system has been disclosed as the likely replacement for the GMZ-series, mechanical mineplanters, it probably will supplement the role formerly held by the GMZ. The UMZ consists of three launchers mounted on each side of the vehicle for a total of six mine launchers per vehicle. Each full turn launcher is hexagonally shaped and contains 30 launch tubes totaling 180. It can fire the mines to one or both sides, or to the rear. Both AP and AT mines are launched from the 140-mm launch tubes. The UMZ uses the same mine canisters as the PKM system. Depending on the position of the launch tubes, one-, two-, or three-lane mine fields can be laid.

Russian Tank-Mounted Mineclearing Roller-Plow KMT-5



<p>SYSTEM</p> <p>Alternative Designations: INA Date of Introduction: 1960s Proliferation: At least 20 countries</p> <p>Description: Weight Total (kg): 7,500 Roller Section: 2,265 Plough: 420 Length (m): 3.2 Width (m): 4 Ditch Crossing (m): 2.5 System Components: Two plows (KMT-4) and two sets of three rollers</p>	<p>MINECLEARING EQUIPMENT</p> <p>Type: Roller and plow Platform: Mounted on T-54, T-55, T-62, other medium tanks Form: 3 rollers x 2 Number of Rollers Per Set: 2 Total Number of Rollers: 6 Mine Removal Speed (km/h): 8-12 Cleared Lane Width, each (mm): 810 x 2 Mineclearing Track Width (mm): 810 Installation Time (min): 30 to 45</p>
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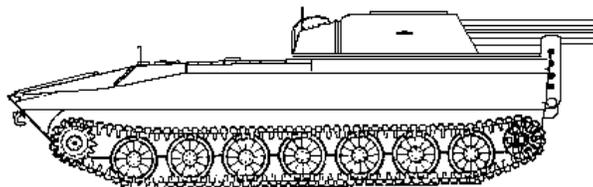
NOTES

The KMT-5M mine roller-plow is very flexible, since it allows for either the plows or the rollers to be used. The rollers function satisfactorily against mines equipped with simple pressure fuzes, but other mines will defeat this equipment. However, the roller-plow combination also allows the tank to counter more sophisticated fuzes with plows designed to uncover or push mines aside. The plows and rollers cannot work simultaneously.

The KMT-5M also includes a luminous lane-marking device for night operations. Because plows and rollers do not clear the area between them a "dogbone" or light chain with rollers is stretched between the roller sections to defeat tilt-rod mines. Quick disconnects allow the operator to drop either plows or rollers or both; otherwise, the crew can remove the system in 8 to 13 minutes. All current medium tanks have fittings for attaching mineclearing equipment.

There is one plow per tank platoon and one roller per company. For tanks newer than the T-55/62 the plows are no longer carried in the engineer company, but are permanently mounted on the tank. Therefore the engineers need only to transport the rollers. One KrAZ-255B truck (with KM-61 crane) or two ZIL-131 trucks can carry one KMT-5M.

Russian Tracked Mineclearing Vehicle MTK-2

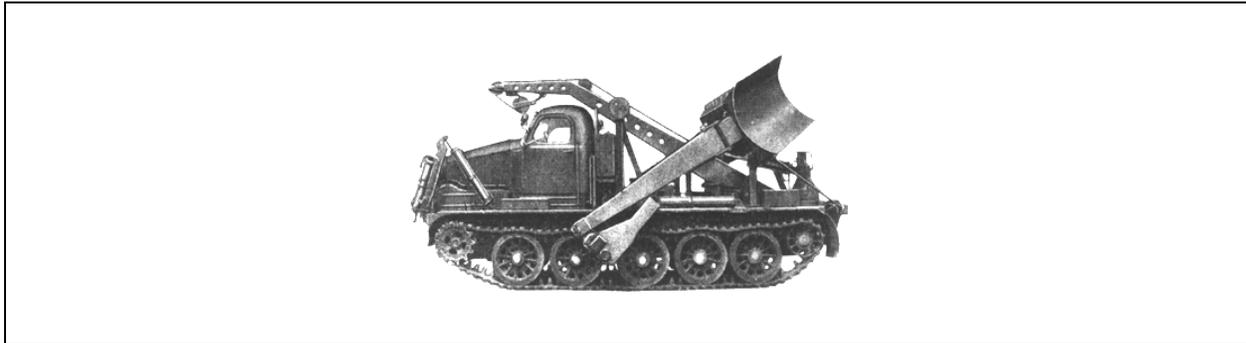


<p>SYSTEM</p> <p>Alternative Designations: UR-77 mineclearing vehicle, M1979 Date of Introduction: 1981 Proliferation: FSU and former Warsaw Pact armies</p> <p>Description: Crew: 2 (commander-operator, driver-mechanic) Chassis: Based on the 2S1 Weight (mt): 15.5 Length (m): 8.4 Height (m): 3.1 Width (m): 2.8 System Components: Vehicle and two mineclearing charges</p> <p>AUTOMOTIVE</p> <p>Cruising Range (km): 500 Speed (km/h): On Road: 60 Off Road: 30 Water: 5 NBC Protection System: Yes Smoke Screening System: No</p>	<p>MINECLEARING EQUIPMENT</p> <p>Type: Explosive line Charges Used: UZP-77, UZ-67 Length of Charge (m): 93 Length of Charge Feed (m): UZP-77: 200 and 500 UZ-67: 200 and 350 Size of Lane in AT Minefield (m): Width: Up to 6 Length (UZP-77): 80-90 Length (UZ-67): 75-80 Breaching Time (min): 3 to 5</p> <p>VARIANTS (INA)</p>
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NOTES

The MTK-2 clears lanes in minefields by using rocket propelled charges. The charges are launched onto the minefield and then detonated by the vehicle commander-operator from within the vehicle. The charge can be fired on land or in the water.

Russian Tracked Route-Clearing Vehicle BAT-M

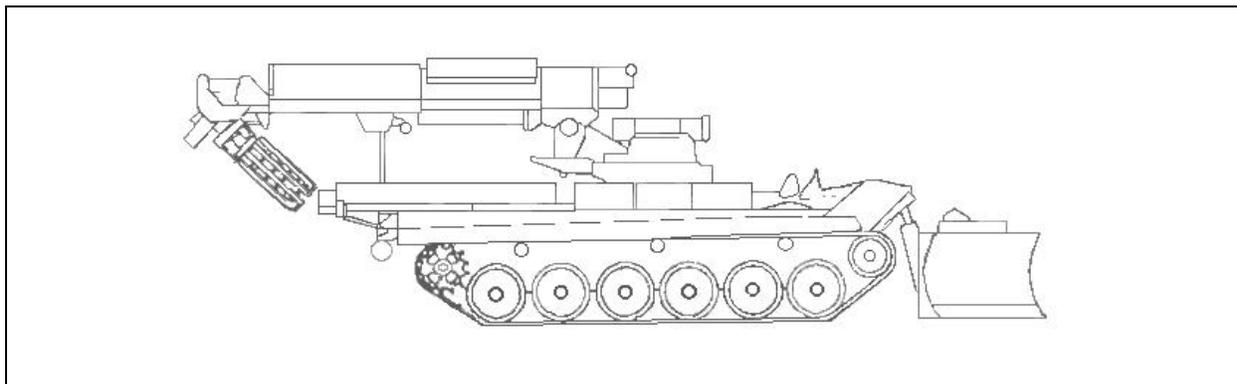


<p>SYSTEM</p> <p>Alternative Designations: Dozer Date of Introduction: 1967 Proliferation: Widespread</p> <p>Description: Crew: 2 Chassis: AT-T heavy tracked artillery tractor Weight (mt): 26 Length Overall (m): 10 Height Travel (m): 3.5 Width Overall (m): 4.7 Clearance (mm): 425 Gradient (°): 30 Trench Crossing (m): 1.57 Fording Depth (m): .7 Vertical Step (m): 1 Time from Travel to Operating Position (min): 5 to 7</p>	<p>AUTOMOTIVE</p> <p>Engine: V12, 415 hp, diesel Cruising Range (km): 500 Speed (km/h): 35 Navigation Equipment: No NBC Protection: Yes Radio: INA</p> <p>BLADE</p> <p>Width (m): 4.8 Blade Rate (m³/hr): 250 Operating Speed (km/h): 10</p> <p>ROTARY CRANE</p> <p>Capacity (mt): 2</p> <p>VARIANTS</p> <p>BAT BAT-2: Based on MT-T artillery tractor</p>
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NOTES

The BAT tractor dozer is a AT-T heavy tractor with a large dozer blade mounted at the front of the hull. It is designed for general engineer use, road and trail clearing and construction. The BAT-M is an improved model (over the BAT) and is electrohydraulic, whereas the BAT is electropneumatic. The BAT-M also has a hydraulic crane, and the dozer blade can be swung to the rear improving the vehicle's load distribution when in travelling mode.

Russian Obstacle Clearing Vehicle IMR-2M



SYSTEM

Alternative Designations: N/A

Date of Introduction: 1982

Proliferation: FSU and former Warsaw Pact armies

Description:

Crew: 2

Chassis: T-72A

Weight (mt): 44.3

Length (traveling) (m): 9.55

Height (traveling) (m): 3.68

Width (traveling) (m): 3.73

Gradient (°): 25

Fording Depth (m): 1.2

System Components: Multipurpose dozer equipment, boom, treadway mine exploder

AUTOMOTIVE

Engine: 12 cyl, 840 hp, diesel

Cruising Range (km): 500

Speed (km/h): 60

Night Driving Equipment: Yes

Radio: R-173 radio, R-174 intercom

NBC Protection System: Yes

Smoke Screening System: INA

BLADE

Can be used as a dozer, grader and V-blade, vertical plane skew ability.

Operating Speed (bulldozer) (km/h): 8-12

Earth Displacement (m³/hr): 300

Lane Clearing Rate (km): .35

ALL-PURPOSE TOOL:

Trench Digging (1.1 to 1.3m deep)(m³/hr): 8-10

Pit Digging (up to 2.5m deep) (m³/hr): 12-16

BOOM

Capacity (mt): 2

Reach (m): 8.4

MINE SWEEPING SPEED (km):

AT pressure mines: 6-15

Tilt Rod mines: 7

VARIANTS

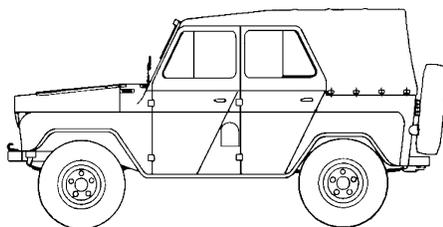
IMR: The IMR is a NBC-protected, combat engineer vehicle based on the T-54/55 tank chassis. It is fitted with an articulating dozer blade and a telescoping crane that fits a number of attachments.

IMR-2: Equipped with mine sweepers and mine-clearing extended charges. Line drawing is of IMR-2.

NOTES

The IMR-2M differs from the IMR-2 in that the IMR-2M has no line-launched mineclearing charge. The IMR-2M has more armor, hydraulic equipment and a scraper-ripper.

Russian 0.6 mt 4 x 4 Utility Truck UAZ-469



SYSTEM

Alternative Designations: INA

Date of Introduction: 1973

Proliferation: Widespread

Description:

Troop Capacity: 2 in front, 5 in rear

Weight (mt):

Gross Vehicle Weight: 2.4

Curb: 1.6

Length Overall (m): 4

Height Overall (m): 2

Width Overall (m): 1.8

Payload on/off Highway (kg): 600

Number of Axles: 2

Ground Clearance (mm): 300

Turning Radius (m): 6.5

Wheels:

Size (in): 8.40x15

Central Tire Pressure Regulation System: No

Run Flat: No

AUTOMOTIVE

Engine: Inline 4, 70 hp, gasoline

Cooling: Water

Cruising Range (road) (km): 730

Speed (km/h): 100

Fuel Capacity (liters):

Left Tank: 39

Right Tank: 39

Towing Capability (kg):

Off Highway: 850

On Highway: 850

Gradient (loaded) (°): 60

Fording Depths (m): .58

Trench Crossing Width (mm): INA

CARGO SPACE

Height (mm): 400

Width (mm): 1,400

Length (mm): 1,000

Cargo Bed Area (m²): 1.6

VARIANTS

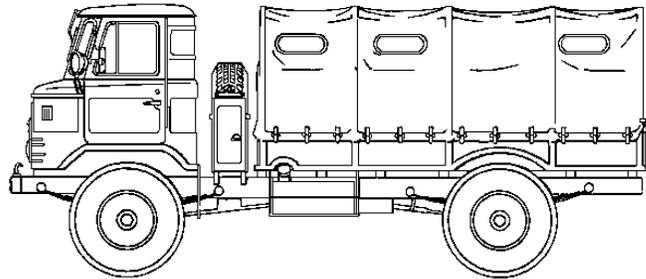
UAZ-469B: Export; lower off-road performance

Ambulance: 1 stretcher patient and 1 attendant

NOTES

The UAZ-469 replaces the earlier UAZ-69.

Russian 2 mt 4 x 4 Cargo Truck GAZ-66



SYSTEM

Alternative Designations: INA
Date of Introduction: 1964
Proliferation: Widespread

Description:

Troop Capacity: 3 in cab, 18 in rear
 Weight (mt):
 Gross Vehicle Weight: 5.8
 Curb: 3.6
 Length Overall (m): 5.65
 Height Overall (m): 2.44
 Width Overall (m): 2.32
 Payload on/off Highway (kg): 2,000
 Number of Axles: 2
 Ground Clearance (mm): 315
 Turning Radius (m): 10
 Wheels:
 Size (in): 12x18
 Central Tire Pressure Regulation System: Yes

AUTOMOTIVE

Engine: V8, 115 hp, gasoline
Cooling: Water
Cruising Range (road) (km): 875
Speed (km/h): 95
Fuel Capacity (liters):
 Left Tank: 105
 Right Tank: 105
Towing Capability (kg):
 Off Highway: 2,000
 On Highway: 2,000
Gradient (loaded) (°): 39
Fording Depths (m): .8

CARGO SPACE

Height (mm): 890
Width (mm): 2,050
Length (mm): 3,330
Cargo Bed Area (m²): 6.8

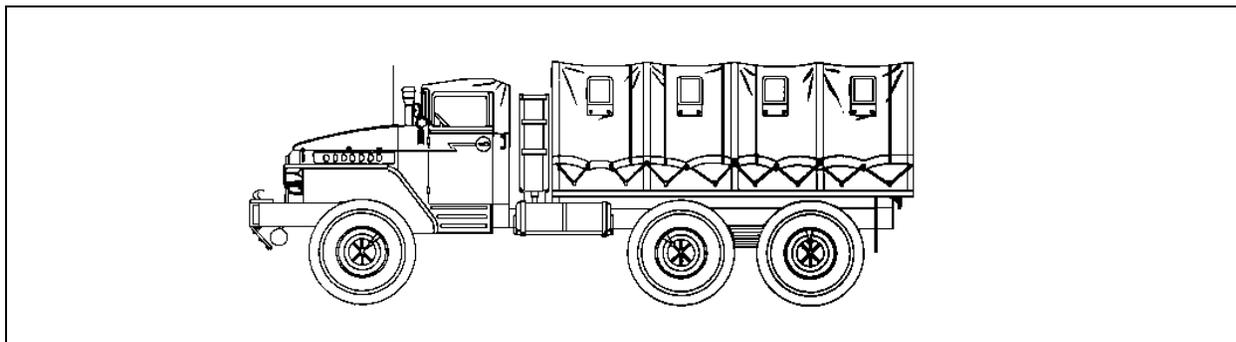
VARIANTS

GAZ-66B: Canvas-top cab for air transport or airdrop
GAZ-66A: Steelcab
 Numerous other variants for various duties.

NOTES

Besides functioning as a general cargo carrier, the GAZ-66 is used as a prime mover for 120-mm mortar. The DDA-66 variant is an NBC decontamination truck.

Russian 4.5 mt 6 x 6 Cargo Truck Ural-375D



SYSTEM

Alternative Designations: INA

Date of Introduction: 1965

Proliferation: Widespread

Description:

Troop Capacity: 3 in cab, 24 in rear

Weight (mt):

Gross Vehicle Weight: 13.2

Curb: 8.4

Length Overall (m): 7.36

Height Overall (m): 2.68

Width Overall (m): 2.67

Number of Axles: 3

Ground Clearance (mm): 410

Turning Radius (m): 10.8

Side Slope (°): 32

Vertical Step (mm): 800

Gradient (loaded) (°): 65

Fording Depths (m): 1.49

Trench Crossing Width (mm): 875

Wheels:

Size (in): 14x20

Central Tire Pressure Regulation System: Yes

Run Flat: INA

AUTOMOTIVE

Engine: V8, 180 hp, gasoline

Cooling: Liquid

Cruising Range (road) (km): 650

Speed (km/h): 75

Fuel Capacity (liters):

Main Tank: 300

Aux Tank: 60

Towing Capability (kg):

Off Highway: 5,000

On Highway: 10,000

CARGO SPACE

Height (mm): 872

Width (m): 2.43

Length (m): 3.9

Cargo Bed Area (m²): 9.5

VARIANTS

URAL-375: Observation hatch and unimproved powertrain

URAL-375E: Decontamination vehicle

URAL-375N: 2,000 kg additional payload

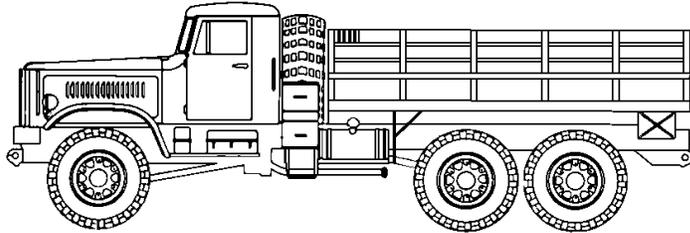
URAL-375S: Truck-tractor

URAL-375T: Equipped with winch

NOTES

Besides functioning as a general cargo carrier, the Ural-375D is used as a prime mover for light and medium artillery. The Ural-375 chassis also serves as a base for the BM-21 MRL, POL tankers, vans, and cranes. The Ural-4320 began to replace the Ural-375D around 1978.

Russian 7.5 mt 6 x 6 Cargo Truck KrAZ-255B



SYSTEM

Alternative Designations: INA

Date of Introduction: 1967

Proliferation: Widespread

Description:

Troop Capacity: 3 in cab, 16 in rear

Weight (mt):

Gross Vehicle Weight: 19.7

Curb: 12

Length Overall (m): 8.64

Height Overall (m): 2.94

Width Overall (m): 2.75

Payload (kg): 7,500

Number of Axles: 3

Ground Clearance (mm): 360

Turning Radius (m): 14

Wheels:

Size (in): 20x21

Central Tire Pressure Regulation System: Yes

Run Flat: INA

AUTOMOTIVE

Engine: V8, 265 hp, diesel

Cooling: Water

Cruising Range (road) (km): 850

Speed (km/h): 70

Fuel Capacity (liters):

Right Tank: 165

Left Tank: 165

Towing Capability (kg):

Off Highway: 10,000

On Highway: 50,000

Gradient (loaded) (°): 30

Fording Depths (m): 1

CARGO SPACE

Length (m): 4.56

Width (m): 2.5

Height (m): .92

Cargo Bed Area (m²): INA

VARIANTS

KrAZ-258: Tractor-truck

Numerous other variants for various duties.

NOTES

Primarily designed as a cargo truck, the KrAZ-255B is also used as a prime mover for various equipment including a tank-transporter trailer and PMP pontoon bridge.

Chapter 9 Rotary-Wing Aircraft

This chapter provides the basic characteristics of selected rotary-wing aircraft readily available to the OPFOR. Both FM 100-60, *Armor- and Mechanized-Based Opposing Force: Organization Guide* and FM 100-63, *Infantry-Based Opposing Force: Organization Guide*, use generic descriptors to indicate helicopter capabilities. This enables the trainer to structure OPFOR air support requirements by capability rather than specific equipment type. ***Rotary-Wing Aircraft***, cover systems classified as light, attack, utility, and heavy aircraft systems. Some multi-role aircraft will be able to support missions across each of the categories. Therefore, they are listed in each of the above categories by their initial design, and their planned application. This chapter encompasses many aircraft which may have a dual civil/military history. It does not include however, aircraft designed and used primarily for civil aviation.

This initial sampling of systems was selected because of their wide proliferation across numerous countries or because of their already extensive use in training scenarios. Additional data sheets addressing other widely proliferated helicopter systems will be sent with further supplements to this guide.

Because of the increasingly large numbers of variants of each aircraft, only the most common variants produced in significant numbers were addressed. If older versions of helicopters have been upgraded in significant quantities to the standards of newer variants, the older versions were not addressed.

The munitions available to each aircraft are mentioned, but not all may be employed at the same time. The weapon systems inherent to the airframe are listed under armament. The most probable weapon loading options are also given, but assigned mission dictates actual weapon configuration. Therefore, any combination of the available munitions may be encountered.

Chapter 10, ***Fixed-Wing Aircraft***, will be constructed with future supplements to this guide. It will provide the basic characteristics of selected fixed-wing aircraft readily available to the OPFOR. It will initially focus on the aircraft commonly employed by the OPFOR when in close proximity to enemy ground forces. Sample aircraft included will be categorized by the missions of reconnaissance, interdiction, strike, direct air support, and transport.

Questions and comments on data listed in this chapter should be addressed to:

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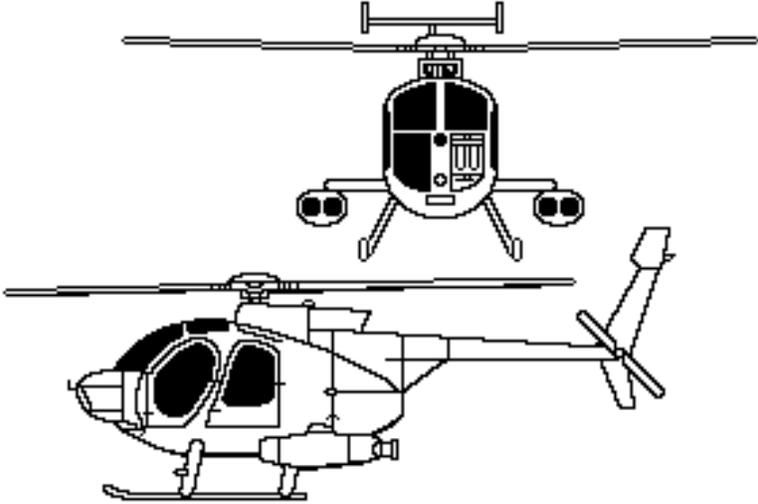
European Light Helicopter BO-105

	<p>Weapon & Ammunition Types</p> <p>Other Loading Options</p> <p>7.62-mm or 12.7-mm MG pods</p> <p>2.75-in rocket pods (7 or 12 ea.)</p> <p>68-mm SNEB rocket pods (12ea)</p> <p>50-mm SNIA rockets (28 ea.)</p> <p>TOW ATGM pods (4 ea.)</p> <p>HOT ATGM</p> <p>AS-12 ASM pods (2 ea.)</p> <p>Stinger AAM pod (4 ea.)</p>	<p>Combat Load</p> <p>2</p> <p>2</p> <p>2</p> <p>2</p> <p>6</p> <p>2</p> <p>1</p>		
	<table border="1"> <tr> <td> <p>SYSTEM</p> <p>Alternative Designations: INA</p> <p>Date of Introduction: 1972</p> <p>Proliferation: At least 40 countries</p> <p>Description: Variants in “()”</p> <p>Crew: 1 or 2 (pilots)</p> <p>Blades:</p> <p> Main rotor: 4</p> <p> Tail rotor: 2</p> <p>Engines: 2x 420-shp Allison 250-C20B turboshaft</p> <p>Weight (kg):</p> <p> Maximum Gross: 2,500</p> <p> Normal Takeoff: 2,000</p> <p> Empty: 1,301, 1,913 (PAH1)</p> <p>Speed (km/h):</p> <p> Maximum (level): 242</p> <p> Cruise: 205</p> <p>Ceiling (m):</p> <p> Service: 3,050</p> <p> Hover (out of ground effect): 457</p> <p> Hover (in ground effect): 1,525</p> <p>Vertical Climb Rate (m/s): 7.5</p> <p>Fuel (liters):</p> <p> Internal: 570</p> <p> Internal Aux Tank: 200 ea. (max 2x)</p> <p>Range (km):</p> <p> Normal Load: 555</p> <p> With Aux Fuel: 961</p> <p>Dimensions (m):</p> <p> Length (rotors turning): 11.9</p> <p> Length (fuselage): 8.8</p> <p> Width: 2.5</p> </td> <td> <p>Dimensions continued (m):</p> <p> Height: 3.0</p> <p> Main Rotor Diameter: 9.8</p> <p> Tail Rotor Diameter: 1.9</p> <p>Cargo Compartment Dimensions (m):</p> <p> Floor Length: 1.9</p> <p> Width: 1.4</p> <p> Height: 1.3</p> <p>Standard Payload (kg):</p> <p> Internal load: 690</p> <p> External on sling only: 1,200</p> <p> Transports 3 troops or 2 litters, or cargo.</p> <p>Survivability/Countermeasures:</p> <p>Main and tail rotors electrically deiced.</p> <p>Infrared signature suppressors can be mounted on engine exhausts.</p> <p>Rotor brake.</p> <p>ARMAMENT</p> <p>Most Probable Armament:</p> <p>BO-105P/PAH1: Outriggers carry 6x HOT antitank missiles, or rocket pods.</p> <p>CASA BO-105/ATH: The Spanish produced variant rigidly mounts 1x Rh 202 20-mm cannon under the fuselage.</p> <p>AVIONICS/SENSOR/OPTICS</p> <p>The BO-105P has a roof-mounted direct-view, daylight-only sight to allow firing of HOT ATGMs. Options exist to fit a thermal imaging system for night operations, and a laser designator.</p> </td> <td> <p>Night/Weather Capabilities:</p> <p>Available avionics include weather radar, Doppler and GPS navigation, and an autopilot. It is capable of operation in day, night, and instrument meteorological conditions.</p> <p>VARIANTS</p> <p>The BO 105 was developed initially by Messerschmitt-Bolkow-Blohm in Germany. Others are built in Chile, the Philippines, Indonesia (NBO-105), and Spain (CASA BO-105/ATH).</p> <p>BO-105CB: The standard production variant.</p> <p>BO-105CBS: VIP version with a slightly longer fuselage to accommodate 6 passengers, some used in a SAR role.</p> <p>BO-105LS: Upgraded to 2x 550-shp Allison 250-C28 turboshaft engines for extended capabilities in high altitudes and temperatures. Produced only in Canada.</p> <p>BO-105M/VBH: Standard reconnaissance version.</p> <p>BO-105P/PAH1: Standard antitank version.</p> </td> </tr> </table>		<p>SYSTEM</p> <p>Alternative Designations: INA</p> <p>Date of Introduction: 1972</p> <p>Proliferation: At least 40 countries</p> <p>Description: Variants in “()”</p> <p>Crew: 1 or 2 (pilots)</p> <p>Blades:</p> <p> Main rotor: 4</p> <p> Tail rotor: 2</p> <p>Engines: 2x 420-shp Allison 250-C20B turboshaft</p> <p>Weight (kg):</p> <p> Maximum Gross: 2,500</p> <p> Normal Takeoff: 2,000</p> <p> Empty: 1,301, 1,913 (PAH1)</p> <p>Speed (km/h):</p> <p> Maximum (level): 242</p> <p> Cruise: 205</p> <p>Ceiling (m):</p> <p> Service: 3,050</p> <p> Hover (out of ground effect): 457</p> <p> Hover (in ground effect): 1,525</p> <p>Vertical Climb Rate (m/s): 7.5</p> <p>Fuel (liters):</p> <p> Internal: 570</p> <p> Internal Aux Tank: 200 ea. (max 2x)</p> <p>Range (km):</p> <p> Normal Load: 555</p> <p> With Aux Fuel: 961</p> <p>Dimensions (m):</p> <p> Length (rotors turning): 11.9</p> <p> Length (fuselage): 8.8</p> <p> Width: 2.5</p>	<p>Dimensions continued (m):</p> <p> Height: 3.0</p> <p> Main Rotor Diameter: 9.8</p> <p> Tail Rotor Diameter: 1.9</p> <p>Cargo Compartment Dimensions (m):</p> <p> Floor Length: 1.9</p> <p> Width: 1.4</p> <p> Height: 1.3</p> <p>Standard Payload (kg):</p> <p> Internal load: 690</p> <p> External on sling only: 1,200</p> <p> Transports 3 troops or 2 litters, or cargo.</p> <p>Survivability/Countermeasures:</p> <p>Main and tail rotors electrically deiced.</p> <p>Infrared signature suppressors can be mounted on engine exhausts.</p> <p>Rotor brake.</p> <p>ARMAMENT</p> <p>Most Probable Armament:</p> <p>BO-105P/PAH1: Outriggers carry 6x HOT antitank missiles, or rocket pods.</p> <p>CASA BO-105/ATH: The Spanish produced variant rigidly mounts 1x Rh 202 20-mm cannon under the fuselage.</p> <p>AVIONICS/SENSOR/OPTICS</p> <p>The BO-105P has a roof-mounted direct-view, daylight-only sight to allow firing of HOT ATGMs. Options exist to fit a thermal imaging system for night operations, and a laser designator.</p>
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NOTES

Available munitions are shown above; not all will be employed at the same time, mission dictates weapons configuration. External stores are mounted on weapons “outriggers” or racks on each side of the fuselage. Each rack has one hardpoint. This helicopter is produced by the Eurocopter Company. It was formed as a joint venture between Aerospatiale of France, and Daimler-Benz Aerospace of Germany. Other missions include: direct air support, antitank, reconnaissance, search and rescue, and transport. Clamshell doors at rear of cabin area open to access cargo area. Cargo floor has tiedown rings throughout.

United States Light Helicopter MD-500/Defender

	<p>Weapon & Ammunition Types</p> <p>Other Loading Options</p> <p>M134 7.62-mm 6x barrel, Gatling type twin MG pods</p> <p>M260 2.75-in Hydra 70 rocket pods (7 or 12 each)</p> <p>.50 cal MG pods</p> <p>M75 40-mm grenade launchers</p> <p>MK19 40-mm grenade launcher</p> <p>TOW missile pods (2 each)</p> <p>Hellfire ATGM</p> <p>Stinger AAM</p>	<p>Combat Load</p> <p>2000</p> <p>2</p> <p>2</p> <p>2</p> <p>2</p> <p>2</p>
<p>SYSTEM</p> <p>Alternative Designations: Hughes model 369, Cayuse, Loach</p> <p>Date of Introduction: 1977 (MD-500 MD)</p> <p>Proliferation: At least 22 countries</p> <p>Description: Variants in “()”</p> <p>Crew: 1 or 2 (pilots)</p> <p>Blades:</p> <p>Main rotor: 4 or 5 (see VARIANTS)</p> <p>Tail rotor: 2 or 4 (see VARIANTS)</p> <p>Engines: (see VARIANTS)</p> <p>Weight (kg):</p> <p>Maximum Gross: 1,361 (500), 1,610 (530)</p> <p>Normal Takeoff: 1,090</p> <p>Empty: 896</p> <p>Speed (km/h):</p> <p>Maximum (level): 241 (500), 282 (530)</p> <p>Cruise: 221 (500), 250 (530)</p> <p>Ceiling (m):</p> <p>Service: 4,635 (500), 4,875 (530)</p> <p>Hover (out of ground effect): 1,830 (500), 3,660 (530)</p> <p>Hover (in ground effect): 2,590 (500), 4,360 (530)</p> <p>Vertical Climb Rate (m/s): 8.4 (500), 10.5 (530)</p> <p>Fuel (liters):</p> <p>Internal: 240</p> <p>Internal Aux Tank: 80</p> <p>Range (km):</p> <p>Normal Load (est.): 485 (500), 430 (530)</p> <p>Dimensions (m):</p> <p>Length (rotors turning): 9.4 (500), 9.8 (530)</p> <p>Length (fuselage): 7.6 (500), 7.3 (530)</p> <p>Width: 1.9</p> <p>Height: 2.6 (500), 3.4 (530 over mast-mounted sight)</p>	<p>Dimensions continued (m):</p> <p>Main Rotor Diameter: 8.0 (500), 8.3 (530)</p> <p>Tail Rotor Diameter: 1.4</p> <p>Cargo Compartment Dimensions (m):</p> <p>Floor Length: 2.4</p> <p>Width: 1.3</p> <p>Height: 1.5</p> <p>Standard Payload (kg):</p> <p>Internal load: INA</p> <p>External load: 550</p> <p>Transports 2 or 3 troops or cargo internally, or 6 on external platforms in lieu of weapons.</p> <p>Survivability/Countermeasures:</p> <p>Some models have radar warning receivers. Chaff and flare systems available. Infrared signature suppressors can be mounted on engine exhausts.</p> <p>ARMAMENT</p> <p>Most Probable Armament: (MD-500D pictured)</p> <p>MD-500MD/Scout Defender: Fitted with guns, rockets, grenade launchers, or a combination on 2x fuselage hardpoints.</p> <p>MD-500MD/TOW Defender: Twin TOW missile pods on 2x fuselage hardpoints; mounts missile sight in lower-left front windshield.</p> <p>AVIONICS/SENSOR/OPTICS</p> <p>The MD-500 allows for the mounting of a stabilized, direct-view optical sight in the windshield. Options exist to fit a mast-mounted, multiple field of view optical sight, a target tracker, a laser rangefinder, thermal imager, a 16x FLIR for night navigation and targeting, and autopilot.</p>	<p>Night/Weather Capabilities:</p> <p>Optional avionics include GPS, ILS and full instrument weather conditions packages. The more advanced variants are fully capable of performing all missions under any conditions.</p> <p>VARIANTS</p> <p>OH-6A/Cayuse: Developed initially by the Hughes Aircraft company (later McDonnell Douglas Helicopter Company) in the mid-1960s for the US Army. Fitted with 1x 253-shp Allison T63-A-5A turboshaft, 4 bladed main rotor, and an offset “V” tail.</p> <p>Hughes 500M: Military export version of OH-6 in mid-1970s with upgraded 278-shp Allison 250-C18 turboshaft engine, “V” tail.</p> <p>MD-500MD/Scout and TOW Defender: Improved military version of the model 500 with 5 main rotor blades, 375-shp Allison 250-C20B turboshaft engine, and T-tail.</p> <p>MD-500E/MD-500MG/Defender II: Had a more elongated nose for streamlining, and an optional 4x blade tail rotor for reduced acoustic signatures. Possible mast-mounted sight.</p> <p>OH-6A/MD-530F Super Cayuse/Lifter: Upgraded engine to a 425-shp Allison 250-C30 turboshaft, and avionics in 1988 for the US Army.</p> <p>MD-530MG/Defender: Has a mast-mounted sight, and incorporated upgrades of all previous variants.</p> <p>AH/MH-6J: US Army Special Operations variant derived from the MD-530MG.</p>

NOTES

Available munitions are shown above; not all will be employed at the same time, mission dictates weapons configuration. External stores are mounted on weapons racks on each side of the fuselage. Each rack has one hardpoint. Other missions include: direct air support, antitank, reconnaissance, observation, and light utility.

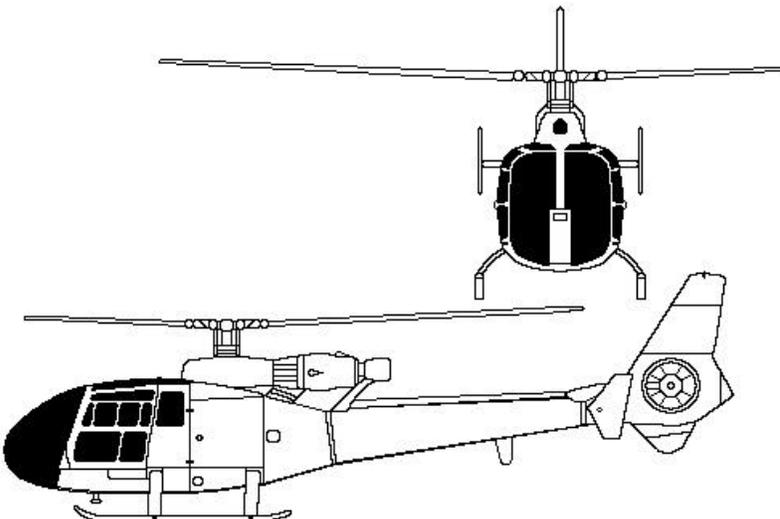
Russian Light Helicopter Mi-2/HOPLITE

		<p>Weapon & Ammunition Types</p> <p>1x 23-mm automatic cannon</p> <p>1x 7.62-mm or 12.7-mm MG</p> <p>Other Loading Options:</p> <p>AT-3c/SAGGER ATGM</p> <p>57-mm Rocket pods (16 each)</p> <p>Twin or single fixed 7.62-mm or 12.7-mm MG</p> <p>External fuel tanks (liters)</p> <p>SA-7b/GRAIL missile</p>	<p>Combat Load</p> <p>4</p> <p>2</p> <p>238</p> <p>4</p>
<p>SYSTEM</p> <p>Alternative Designations: INA</p> <p>Date of Introduction: 1965</p> <p>Proliferation: Widespread</p> <p>Description:</p> <p>Crew: 1 (pilot)</p> <p>Blades:</p> <p>Main rotor: 3</p> <p>Tail rotor: 2</p> <p>Engines: 2x 400-shp PZL GTD-350 (series III and IV) turboshaft</p> <p>Weight (kg):</p> <p>Maximum Gross: 3,700</p> <p>Normal Takeoff: 3,550</p> <p>Empty: 2,372</p> <p>Speed (km/h):</p> <p>Maximum (level): 220</p> <p>Cruise: 194</p> <p>Ceiling (m):</p> <p>Service: 4,000</p> <p>Hover (out of ground effect): 1,000</p> <p>Hover (in ground effect): 2,000</p> <p>Vertical Climb Rate (m/s): 4.5</p> <p>Fuel (liters):</p> <p>Internal: 600</p> <p>Internal Aux Tank: N/A</p> <p>External Fuel Tank: 238 ea.</p> <p>Range (km):</p> <p>Maximum Load: 580</p> <p>Normal Load: 340</p> <p>With Aux Fuel: 790</p>	<p>Dimensions (m):</p> <p>Length (rotors turning): 17.4</p> <p>Length (fuselage): 11.9</p> <p>Width: 3.2</p> <p>Height: 3.7</p> <p>Main Rotor Diameter: 14.6</p> <p>Tail Rotor Diameter: 2.7</p> <p>Standard Payload:</p> <p>Transports 6-8 troops or 700 kg internal cargo or 800 kg external load on 4x external hardpoints.</p> <p>Survivability/Countermeasures:</p> <p>Main and tail rotor blades electrically deiced.</p> <p>ARMAMENT</p> <p>23-mm Automatic Cannon, NS-23KM:</p> <p>Range: (practical) 2,500 m</p> <p>Elevation/Traverse: None (rigidly-mounted)</p> <p>Ammo type: HEFI, HEI, APT, APE, CC</p> <p>Rate of Fire (rpm): (practical) 550</p> <p>7.62-mm or Pintle-mounted Machinegun:</p> <p>(may be mounted in left-side cabin door)</p> <p>Range: (practical) 1,000 m</p> <p>Ammo type: HEFI, HEI, APT, APE, CC</p> <p>Rate of Fire (rpm): (practical) 250</p> <p style="text-align: center;">OR</p> <p>12.7-mm or Pintle-mounted Machinegun:</p> <p>(may be mounted in left-side cabin door)</p> <p>Range: (practical) 1,500 m</p> <p>Ammo type: API, API-T, IT, HEI</p> <p>Rate of Fire (rpm): (practical) 100</p>	<p>AVIONICS/SENSOR/OPTICS</p> <p>The cannon is pilot sighted, and fire is adjusted by controlling the attitude of the aircraft.</p> <p>Night/Weather Capabilities:</p> <p>The Mi-2 is primarily a daylight only aircraft.</p> <p>VARIANTS</p> <p>Mi-2R: Ambulance version that carries 4x litter patients.</p> <p>Mi-2T: Transport version that carries 8 personnel.</p> <p>Mi-2URN: Armed reconnaissance variant, employs 57-mm unguided rockets, and mounts a gunsight in the cockpit for aiming all weapons.</p> <p>Mi-2URP: The antitank variant. Carries 4x AT-3 Sagger wire-guided missiles on external weapons racks, and 4x additional missiles in the cargo compartment.</p> <p>Mi-2US: The gunship variant, employs an airframe modification that mounted a 23-mm NS-23KM cannon to the portside fuselage. Also employs 2x 7.62-mm gun pods on external racks, and 2x 7.62-mm pintle-mounted machineguns in the cabin.</p> <p>PZL Swidnik: A Polish-produced variant under license from Russia. Same performance, characteristics, and missions.</p>	

NOTES

Available munitions are shown above; not all will be employed at the same time, mission dictates weapons configuration. External stores are mounted on weapons racks on each side of the fuselage. Each rack has two hardpoints for a total of four stations. Additional missions include; direct air support, antitank, armed reconnaissance, transport, medevac, airborne command post, smoke generating, minelaying, and training. The cabin door is hinged rather than sliding, which may limit operations. There is no armor protection for the cockpit or cabin. Ammo storage is in the aircraft cabin, so combat load varies by mission. Some Mi-2USs currently employ fuselage-mounted weapon racks rather than the 23-mm fuselage-mounted cannon which is removed. Some variants however, still employ the cannon.

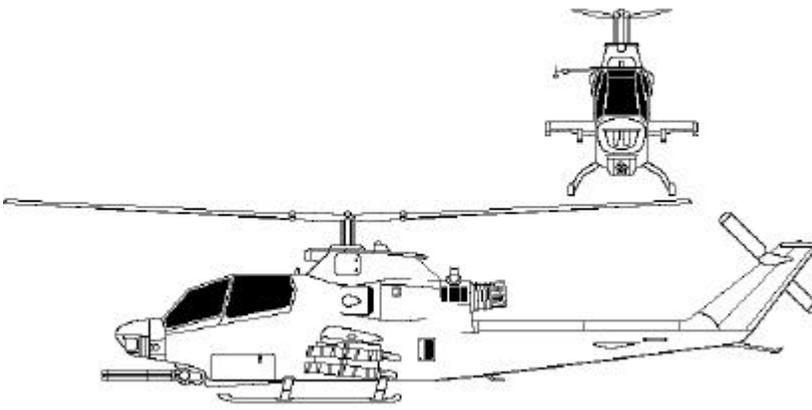
French Light Helicopter SA-341/GAZELLE

		Weapon & Armament Types 7.62-mm MG or 20-mm GIAT M.621 cannon or 2x 7.62-mm AA-52 FN MG pods Other Loading Options 2.75-in rocket pods (7 ea.) 68-mm SNEB rocket pods (12 ea.) 57-mm rockets (18 ea.) HOT ATGM AT-3 SAGGER ATGM AS-11 ASM, or AS-12 ASM SA-7 GRAIL AAM MISTRAL AAM	Combat Load 100 1,000 2 2 2 4-6 4 4 or 2 2 2
		SYSTEM Alternative Designations: SA-342 Date of Introduction: 1973 Proliferation: At least 23 countries Description: Variants in “()” Crew: 1 or 2 (pilots) Blades: Main rotor: 3 Tail rotor: 13 (fenestron enclosed in tail) Engines: 1x 590-shp Turbomeca Astazou IIIB turboshaft Weight (kg): Maximum Gross: 1,800 (SA 341), 1,900 (SA 342K), 2,000 (SA 342L/M) Normal Takeoff: 1,800 Empty: 998 Speed (km/h): Maximum (level): 310 Cruise: 270 Ceiling (m): Service: 4,100 (SA 341), 5,000 (SA 342) Hover (out of ground effect): 2,000 (SA 341), 2,370 (SA 342) Hover (in ground effect): 2,850 (SA 341), 3,040 (SA 342) Vertical Climb Rate (m/s): 12.2 Fuel (liters): Internal: 445 Internal Aux Tank: 90 Additional Internal Aux Tank: 200 Range (km): Normal Load: 670 (SA 341), 735 (SA 342)	Dimensions (m): Length (rotors turning): 11.9 Length (fuselage): 9.5 Width: 2.0 Height: 3.1 Main Rotor Diameter: 10.5 Tail Rotor Diameter: 0.7 Cargo Compartment Dimensions (m): Floor Length: 2.2 Width: 1.3 Height: 1.2 Standard Payload (kg): Internal load: 750 External on sling only: 700 Transports 3 troops or 1 litter, or cargo. Survivability/Countermeasures: IR signature suppressor on engine exhaust. ARMAMENT Most Probable Armament: SA 341F: A GIAT M.621 20-mm cannon is installed on starboard side of some aircraft. Rate of fire is selectable at 300 or 740 rpm. SA 341H: Can carry 4x AT-3 ATGMs, and 2x SA-7, or 128-mm or 57-mm rockets, and 7.62-mm machinegun in cabin. SA 342K: Armed antitank version with 4-6x HOT ATGMs. SA 342L: Either rocket pods or machineguns. SA 342M: Armed with 4-6x HOT antitank missiles, and possibly fitted with Mistral air to air missiles.

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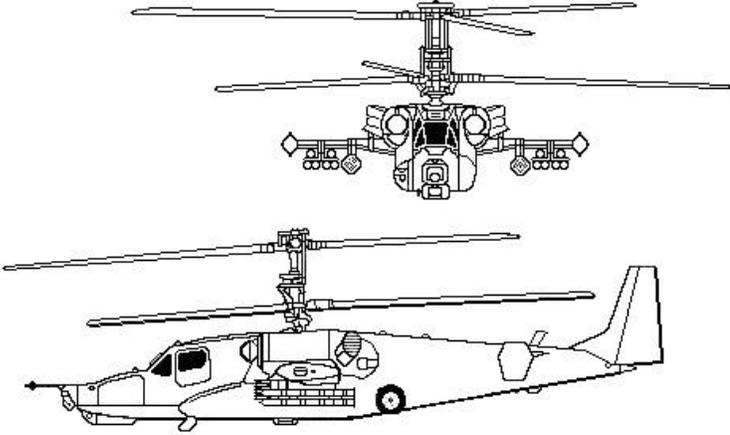
United States Attack Helicopter AH-1F/COBRA

	<p>Weapon & Ammunition Types</p> <p>20-mm 3x barrel Gatling gun</p> <p>Other Loading Options</p> <p>TOW missile pods (4 each)</p> <p>2.75-in Hydra 70 rocket pods (19 each)</p> <p>7.62-mm 6x barrel rotary MG pods</p>	<p>Combat Load</p> <p>750</p> <p>0-2</p> <p>2-4</p> <p>0-2</p>
<p>SYSTEM</p> <p>Alternative Designations: Hueycobra, Bell 209</p> <p>Date of Introduction: 1986 (AH-1S)</p> <p>Proliferation: At least 11 countries</p> <p>Description: Crew: 2 (pilots in tandem seats) Blades: Main rotor: 2 Tail rotor: 2 Engines: 1x 1,800-shp AlliedSignal Engines T-53-L-703 turboshaft Weight (kg): Maximum Gross: 4,535 Normal Takeoff: 4,524 Empty: 2,993 Speed (km/h): Maximum (level): 315 Cruise: 227 Max "G" Force: INA Ceiling (m): Service: 3,720 Hover (out of ground effect): INA Hover (in ground effect): 3,720 Vertical Climb Rate (m/s): 8.5 Internal Fuel (liters): 991 Range (km): Normal Load: 610 With Aux Fuel: N/A Dimensions (m): Length (rotors turning): 16.3 Length (fuselage): 13.6 Width (including wing): 3.2 Height: 4.1 Main Rotor Diameter: 13.4 Tail Rotor Diameter: 2.6 Cargo Compartment Dimensions: negligible Standard Payload (kg): 1,544</p>	<p>Survivability/Countermeasures: Infrared signature suppressors mounted on engine exhaust. Radar warning receivers, IFF, Infrared jammer, chaff and flares. Armored cockpit.</p> <p>ARMAMENT The chin-mounted turret accepts Gatling-type guns ranging from 7.62-mm to 30-mm. Some aircraft have been modified to accept Stinger missiles (air-to-air Stinger or ATAS).</p> <p>20-mm 3x barrel Gatling gun, M197: Range: (practical) 1,500 m Elevation: 21° up to 50° down Traverse: 220° Ammo Type: AP, HE Rate of Fire: burst 16±4, continuous 730±50</p> <p>Most Probable Armament: AH-1G: Either 2x 7.62-mm miniguns with 4,000 rounds or 2x 40-mm grenade launchers with 300 rounds (one each is possible) in chin turret. Also on underwing hardpoints, 2.75-in. FFAR, minigun pods, or 20-mm automatic cannons. AH-1S: M197, 3x barrel 20-mm Gatling gun in chin turret. Also on underwing hardpoints, 8x BMG71 TOW antitank missiles, and 2x 2.75-in FFAR rocket pods.</p> <p>AVIONICS/SENSOR/OPTICS The TOW missile targeting system uses a telescopic sight unit (traverse 110°, elevation – 60°/+30°), a laser augmented tracking capability, thermal sights and a FLIR to allow for acquisition, launch, and tracking of all types of TOW missiles in all weather conditions.</p>	<p>The Cobra also uses a digital ballistic computer, a HUD, Doppler nav, and a low speed air data sensor on the starboard side for firing, and has in-flight boresighting. Available Israeli-made upgrades include an integrated FLIR with laser rangefinder, GPS, automatic boresighting, and the ability to fire both TOW II and Hellfire missiles.</p> <p>Night/Weather Capabilities: The AH-1 is fully capable of performing its attack mission in all weather conditions.</p> <p>VARIANTS Most older Cobra variants still in operation have been upgraded to the AH-1F standard. Also produced in Romania and Japan under license from Bell Textron in the U.S.</p> <p>AH-1G: Initial production model in 1966</p> <p>AH-1S: Upgraded 1960s produced aircraft in late 1980s to the standard TOW carrying version.</p> <p>AH-1P: A set of AH-1S aircraft fitted with composite rotors, flat plate glass cockpits, and NVG capabilities.</p> <p>AH-1E: A set of AH-1S aircraft upgraded with the Enhanced Cobra Armament System incorporating the universal turret, 20-mm gun, automatic compensation for off-axis gun firing, and weapon management system.</p> <p>AH-1F: Current standard Cobra. Also referred to as the "Modernized Cobra". Incorporated all past upgrades.</p> <p>AH-1J/-1T/-1W: See separate AH-1W entry.</p>

NOTES

Available munitions are shown above; not all may be employed at one time. Mission dictates weapon configuration. External stores are mounted on underwing external stores points. Each wing has two hardpoints for a total of four stations. A representative mix when targeting armor formations would be eight TOW missiles, two 2.75-in rocket pods, and 750x 20-mm rounds. The gun must be centered before firing underwing stores. Additional missions include direct air support, antitank, armed escort, and air to air combat. Armored cockpit can withstand small arms fire, and composite blades and tailboom are able withstand damage from 23-mm cannon hits. small arms fire, and composite blades and tailboom able to withstand damage from 23-mm cannon hits.

Russian Attack Helicopter Ka-50/HOKUM

	<p>Weapon & Ammunition Types</p> <p>1x 2A42 30-mm cannon HE-Frag AP Total</p> <p>Other Loading Options</p> <p>AT-16 VIKhR ATGM (6 each) 80-mm rockets (20 each) Twin 23-mm gun pods 500-kg bombs AA-11/ARCHER AAM External fuel tanks (liters)</p>	<p>Combat Load</p> <p>250 <u>250</u> 500</p> <p>2 2 940 4 2 500</p>
<p>SYSTEM</p> <p>Alternative Designations: Black Shark, Werewolf Date of Introduction: N/A Proliferation: Preproduction. An initial fielding plan is for 2 per year for 14 years.</p> <p>Description: Crew: 1 (pilots, 2 in Ka-52) Blades: Main rotor: 6 (2 heads, 3 blades each) Tail rotor: None Engines: 2x 2,200-shp Klimov TV3-117VK turboshaft Weight (kg): Maximum Gross: 10,800 Normal Takeoff: 9,800 Empty: 7,692 Speed (km/h): Maximum (level): 340 (est.) Cruise: 270 Sideward: 100+, Rearward: 100+ Turn Rate: unlimited Max "G" Force: +3 to +3.5 g Ceiling (m): Service: 5,500 Hover (out of ground effect): 4,000 Hover (in ground effect): 5,500 Vertical Climb Rate (m/s): 10 Fuel (liters): Internal: INA External Fuel Tank: 500 ea. (max 4x) Range (km): Maximum Load: INA Normal Load: 460 With Aux Fuel: INA Dimensions (m): Length (rotors turning): 16 Length (fuselage): 15.0 Width (including wing): 7.34 Height (gear extended): 4.93 Height (gear retracted): 4 Main Rotor Diameter: 14.5</p>	<p>Cargo Compartment Dimensions: Negligible Standard Payload: External weapons load: 2,500 kg on 4 underwing stores points.</p> <p>Survivability/Countermeasures: Main rotors and engines electrically deiced. Infrared signature suppressors can be mounted on engine exhausts. Radar warning receivers, IFF, chaff and flares. Armored cockpit and self-sealing fuel tanks. Pilot ejection system. (see NOTES)</p> <p>ARMAMENT 30-mm Automatic Cannon, 2A42: Range: effective 3,000 m Elevation: -45° to +10° Traverse: ±15° Ammo type and rate of fire is selectable by pilot (HE or AP, 350 or 600)</p> <p>Most Probable Armament: (shown above) HOKUM A/N: Fuselage-mounted 30-mm cannon on right side, 80-mm rockets, AT-16 VIKhR ATGMs.</p> <p>HOKUM B: Same as above.</p> <p>ATGM, AT-16/VIKhr: Guidance: Laser Beam Rider SACLOS Range: 10,000 m Warhead: HEAT Penetration: 900 mm Effective against ground & air targets at converging speeds to 800 km/h. ATGM racks can depress to 12°.</p>	<p>AVIONICS/SENSOR/OPTICS</p> <p>The HOKUM uses a low-light level TV or thermal sighting, a laser range-finder (10 km), FLIR, air data sensor, and digital data-link which interface with a fire control computer, an autopilot, a helmet sighting system and HUD for target location, acquisition, designation, and firing.</p> <p>Night/Weather Capabilities: This aircraft's avionics package ensuring a full day/night, all weather capability. If it is to be employed at night in an attack role, it must be fitted with a night targeting pod. This pod includes a FLIR, a millimeter wave radar, and an electro-optical sight takes up one of the underwing pylons. The Ka-50N, and Ka-52 are capable of performing attack missions in day/night, and all-weather conditions. The French companies Thomson-CSF, and Sextant Avionique offer nav/attack systems, which can be fitted to export variants.</p> <p>VARIANTS</p> <p>Ka-50A/HOKUM A: Standard direct air support variant.</p> <p>Ka-50N/HOKUM N: Night attack variant fitted with a nose-mounted FLIR. The cockpit is fitted with an additional TV display, and is NVG compatible.</p> <p>Ka-52/HOKUM B: The "Alligator" is a side-by-side, two-seat cockpit variant of the Ka-50. The gross weight of the aircraft is greater, so the performance is marginally degraded. But airframe characteristics, dimensions, and armaments are relatively similar. It includes a mast-mounted millimeter wave radar covering the front quadrant only. It is used as an attack aircraft, and as a trainer for the Ka-50.</p>

Russian Attack Helicopter Ka-50/HOKUM continued

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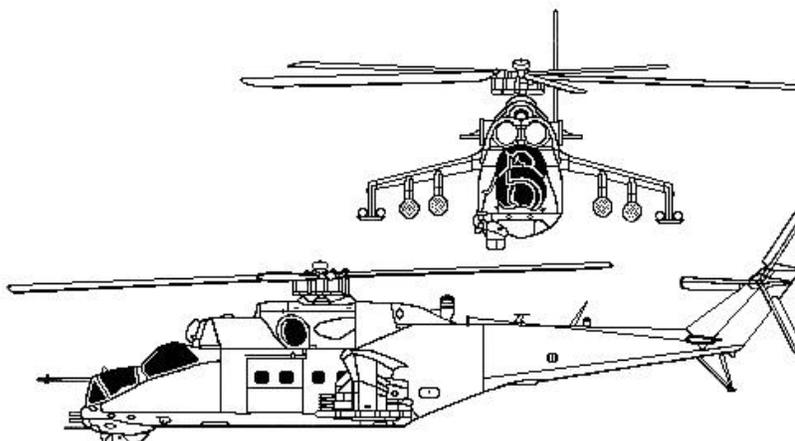
NOTES

This aircraft is not fielded. Only a handful of prototypes exist, and it has not yet been approved for full-scale production.

The fully armored pilot's cabin can withstand 23-mm gunfire, and the cockpit glass 12.7-mm MG gunfire. The Zvezda K-37-800 pilot ejection system functions at any altitude. Available munitions are shown above; not all may be employed at one time. Mission dictates weapons configuration. External stores are mounted on underwing external hardpoints. Each wing has two hardpoints for a total of four stations. A typical mix for targeting armor formations is 12x AT-16 ATGMs, 500x 30-mm cannon rounds, and 2x 20-round pods of 80-mm folding fin unguided rockets. It was designed for remote operations, and not to need ground maintenance facilities for 2 weeks. The 30-mm cannon is the same as on the BMP-2. The firing computer will turn the aircraft to keep the gun on target. A coaxial counter-rotating rotor system negates the need for a tail rotor and its drive system. Because of this, this aircraft is unaffected by wind strength and direction, has an unlimited hovering turn rate, and gives a smaller profile and acoustic signature, while allowing a 10-15% greater power margin. The airframe is 35% composite materials with a structural central 1m³ keel beam of kevlar/nomex that protects critical systems and ammunition. The HOKUM is fully aerobatic. It can perform loops, roll, and "the funnel", where the aircraft will maintain a concentrated point of fire while flying circles of varying altitude, elevation, and airspeed around the target.

Russian Attack Helicopter Mi-24/HIND

	Weapon & Ammunition Types	Combat Load

	<table border="0"> <tr> <td>1x twin 30-mm gun or 12.7-mm 4 barrel turret gun</td> <td style="text-align: right;">750 1,470</td> </tr> <tr> <td colspan="2">Other Loading Options</td> </tr> <tr> <td>AT-2C or AT-6C ATGMs</td> <td style="text-align: right;">2-12</td> </tr> <tr> <td>80-mm S-8 rocket pods (20 ea.)</td> <td style="text-align: right;">2-4</td> </tr> <tr> <td>57-mm S-5 rocket pods (32 ea.)</td> <td style="text-align: right;">2-4</td> </tr> <tr> <td>GSh-23L twin 23-mm MG pods</td> <td style="text-align: right;">940</td> </tr> <tr> <td>250-kg bombs</td> <td style="text-align: right;">4</td> </tr> <tr> <td>500-kg bombs</td> <td style="text-align: right;">2</td> </tr> <tr> <td>External fuel tanks (liters)</td> <td style="text-align: right;">500</td> </tr> </table>	1x twin 30-mm gun or 12.7-mm 4 barrel turret gun	750 1,470	Other Loading Options		AT-2C or AT-6C ATGMs	2-12	80-mm S-8 rocket pods (20 ea.)	2-4	57-mm S-5 rocket pods (32 ea.)	2-4	GSh-23L twin 23-mm MG pods	940	250-kg bombs	4	500-kg bombs	2	External fuel tanks (liters)	500
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<p>SYSTEM</p> <p>Alternative Designations: INA Date of Introduction: 1976 (HIND D) Proliferation: At least 34 countries</p> <p>Description: Crew: 2 (pilots in tandem cockpits) Blades: Main rotor: 5 Tail rotor: 3 Engines: 2x 2,200-shp Klimov TV3-117VMA turboshaft Weight (kg): Maximum Gross: 11,500 Normal Takeoff: 11,100 Empty: 8,500 Speed (km/h): Maximum (level): 335 Cruise: 295 Max "G" Force: 1.75 g Ceiling (m): Service: 4,500 Hover (out of ground effect): 1,500 Hover (in ground effect): 2,200 Vertical Climb Rate (m/s): 15 Fuel (liters): Internal: 1,840 Internal Aux Tank (in cabin): 1,227 External Fuel Tank: 500 ea. Range (km): Normal Load: 450 With Aux Fuel: 950 Dimensions (m): Length (rotors turning): 21.6 Length (fuselage): 17.5 Width (including wing): 6.5 Height (gear extended): 6.5 Main Rotor Diameter: 17.3 Tail Rotor Diameter: 3.9 Cargo Compartment Dimensions (m): Floor Length: 2.5 Width: 1.5 Height: 1.2</p>	<p>Standard Payload: Internal load: 8 combat troops or 4 litters External weapons load: 1,500 kg External load (no weapons): 2,500 kg</p> <p>Survivability/Countermeasures: Main and tail rotors electrically deiced. Infrared signature suppressors can be mounted on engine exhausts. Radar warning receivers, IFF, Infrared jammer, rotor brake, chaff and flares. Armored cockpit.</p> <p>ARMAMENT Loaded combat troops can fire personal weapons through cabin windows.</p> <p>12.7-mm 4x Barrel Machinegun, YaKB-12.7: Range (m): (practical) 1,500 Elevation/Traverse: 20° up to 60° down/ 120° Ammo Type: HEFI, APT, Duplex, DuplexT Rate of Fire (rpm): up to 4,500 (pilot selectable)</p> <p style="text-align: center;">OR</p> <p>30-mm Twin Barrel Cannon, GSh-30K: Range (m): (practical) 4,000 Elevation/Traverse: None (rigidly mounted) Ammo Type: HEFI, HEI, APT, APE, CC Rate of Fire (rpm): 300, or 2,000 to 2,600</p> <p>Most Probable Armament: (HIND F pictured) HIND D: Turret-mounted 4-barrel 12.7-mm Gatling type machinegun, 57-mm rockets, AT-2C/SWATTER ATGMs. HIND E: Turret-mounted 4-barrel 12.7-mm Gatling type machinegun or twin barrel 23-mm turret gun, 57-mm rockets, AT-6C/ SPIRAL ATGMs. HIND F: Fixed 30-mm twin gun on the right fuselage side, 57-mm rockets, AT-6C/ SPIRAL ATGMs.</p>	<p>AVIONICS/SENSOR/OPTICS The ATGM targeting system uses a low-level light TV, a laser designator, FLIR, air data sensor, and a missile guidance transmitter.</p> <p>Night/Weather Capabilities: HIND D versions are primarily daytime aircraft only. Some HIND E and Mi-35 series export versions have upgraded night and weather capabilities, better avionics, weather radar, autopilot, HUD, GPS, NVG compatibility, more armor, and an increased weapons load provided by the French company Sextant Avionique.</p> <p>VARIANTS Nearly all of the older HIND A, B and C variants have been upgraded or modified to the HIND D or E standard.</p> <p>Mi-24D/HIND D: Direct air support.</p> <p>Mi-24V/HIND E: Direct air support. Most proliferated version.</p> <p>Mi-24P/HIND F: Direct air support. The fixed twin gun cut the turret profile, and empty weight to 8,200 kg, while boosting maximum gross weight to 12,000 kg.</p> <p>Mi-24R/HIND G-1: NBC sampling. It has mechanisms to obtain soil and air samples, filter air, and place marker flares.</p> <p>Mi-24K/HIND G-2: Photo-recon, and artillery spotting. Has a camera in cabin, gun, rocket pods, but no targeting system.</p> <p>Mi-25: Export version of the HIND D.</p> <p>Mi-35: Export version of the HIND E. The Mi-35M has a twin barrel 23-mm gun.</p> <p>Mi-35P: Export version of the HIND F.</p>																	

Russian Attack Helicopter Mi-24/HIND continued

NOTES

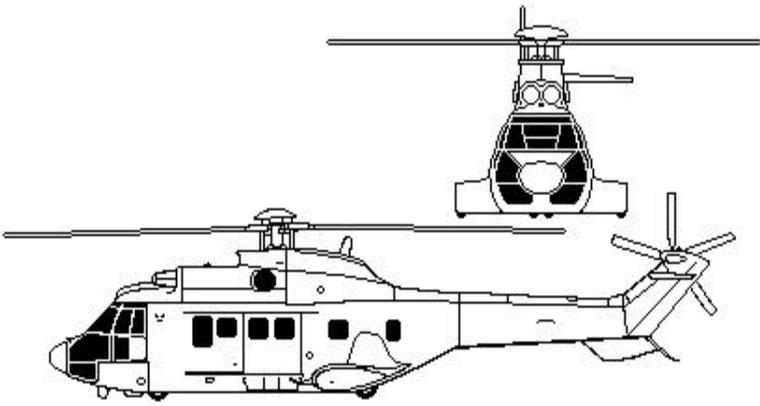
Available munitions are shown above; not all may be employed at one time. Mission dictates weapon configuration. External stores are mounted on underwing external stores points. Each wing has three hardpoints for a total of six stations. A representative mix when targeting armor formations would be eight AT-6 ATGMs, 750x 30-mm rounds, and two 57-mm rocket pods. Additional missions include direct air support, antitank, armed

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escort, and air to air combat. The aircraft can store an additional ammunition basic load in the cargo compartment in lieu of carrying troops. Armored cockpits and titanium rotor head able to withstand 20-mm cannon hits. Every aircraft has an overpressurization system for operation in a NBC environment.

The HIND's wings provide 22% to 28% of its lift in forward flight. In a steep banking turn at slower airspeeds, the low wing can lose lift while it is maintained on the upper wing, resulting in an excessive roll. This is countered by increasing forward airspeed to increase lift on the lower wing. Because of this characteristic, and the aircraft's size and weight, it is not easily maneuverable. Therefore they usually attack in pairs or multiple pairs, and from various directions.

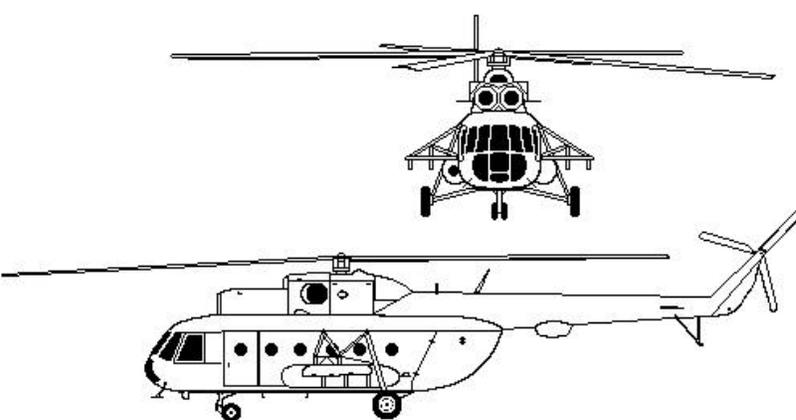
European Utility Helicopter AS-532/COUGAR

	<p>Weapon & Ammunition Types</p> <p>7.65-mm MG</p> <p>Other Loading Options</p> <p>20-mm twin gun pods</p> <p>68-mm rocket pods (22 each)</p> <p>2.75-in rocket pods (19 each)</p> <p>External fuel tanks (liters)</p>	<p>Combat Load</p> <p>2</p> <p>2</p> <p>2</p> <p>2</p> <p>600</p>		
	<table border="1"> <tr> <td> <p>SYSTEM</p> <p>Alternative Designations: AS 332 Super Puma, SA 330 Puma</p> <p>Date of Introduction: 1981</p> <p>Proliferation: At least 38 countries</p> <p>Description: Variants in “()”</p> <p>Crew: 2 (pilots)</p> <p>Blades:</p> <p> Main rotor: 4</p> <p> Tail rotor: 5, 4 (U2/A2)</p> <p>Engines: 2x 1,877-shp Turbomeca Makila 1A1 turboshaft</p> <p>Weight (kg):</p> <p> Maximum Gross: 9,000 (Mk I), 9,750 (Mk II)</p> <p> Normal Takeoff: 8,600 (Mk I), 9,300 (Mk II)</p> <p> Empty: 4,330 (UC/AC), 4,460 (UL/AL), 4,760 (U2/A2)</p> <p>Speed (km/h):</p> <p> Maximum (level): 275 (Mk I), 325 (Mk II)</p> <p> Cruise: 270</p> <p>Ceiling (m):</p> <p> Service: 4,100</p> <p> Hover (out of ground effect): 1,650 (Mk I), 1,900 (Mk II)</p> <p> Hover (in ground effect): 2,800 (Mk I), 2,540 (Mk II)</p> <p>Vertical Climb Rate (m/s): 7</p> <p>Fuel (liters):</p> <p> Internal: 1,497 (UC/AC), 2,000 (UL/AL), 2,020 (U2/A2)</p> <p> Internal Aux Tank: 475 ea. (4x Mk I, 5x Mk II)</p> <p>Range (km):</p> <p> Normal Load: 620 (UC/AC), 840 (UL/AL), 800 (U2/A2)</p> <p> With Aux Fuel: 1,017 (UC/AC), 1, 245 (UL/AL), 1,176 (U2/A2)</p> <p>Dimensions (m):</p> <p> Length (rotors turning): 18.7-19.5 (U2/A2)</p> </td> <td> <p>Dimensions continued (m):</p> <p> Length (fuselage): 15.5 (UC/AC), 16.3 (UL/AL), 16.8 (U2/A2)</p> <p> Width: 3.6-3.8 (U2/A2)</p> <p> Height: 4.6</p> <p> Main Rotor Diameter: 15.6-16.2 (U2/A2)</p> <p> Tail Rotor Diameter: 3.1-3.2 (U2/A2)</p> <p>Cargo Compartment Dimensions (m):</p> <p> Floor Length: 6.5 (AC/UC), 6.8 (UL/AL), 7.9 (U2/A2)</p> <p> Width: 1.8</p> <p> Height: 1.5</p> <p>Standard Payload (kg):</p> <p> Internal load: 3,000</p> <p> External on sling only: 4,500</p> <p> Transports 20-29 troops or 6-12 litters (variant dependant), or cargo.</p> <p>Survivability/Countermeasures:</p> <p> Main and tail rotor blades electrically deiced. A radar warning receiver is standard, while a laser warning receiver, missile launch detector, missile approach detector, infrared jammer, decoy launcher, and flare/chaff dispensers are optionally available.</p> <p>ARMAMENT</p> <p> The Mk I variants may employ 2x 7.65-mm machine guns on pintle-mounts in the cabin doors when employed in a transport role.</p> <p>Most Probable Armament</p> <p> The armed versions have side-mounted 20-mm machineguns and/or axial pods fitted with 68-mm rocket launchers.</p> <p>AVIONICS/SENSOR/OPTICS</p> <p>Night/Weather Capabilities:</p> <p> The aircraft is NVG compatible, and through its instruments, avionics, full autopilot, and nav computer, is capable of operation in day, night, and instrument meteorological conditions.</p> </td> <td> <p>VARIANTS</p> <p>SA 330 Puma: Developed in the late 1960s by Aerospatiale in France. Others were built in the UK, Indonesia, Romania.</p> <p>AS 332 Super Puma: Differs from the SA 330 Puma through an improved rotor system, upgraded engines, stretched fuselage, and a modified nose shape.</p> <p>The Cougar name was adopted for all military variants, and in 1990, all Super Puma designations were changed from AS 332 to AS 532 to distinguish between civil and military variants. The “5” denotes military, “A” is armed, “C” is armed-antitank, and “U” is utility. The second letter represents the level of “upgrading”.</p> <p>AS-532 Cougar UC/AC Mk I: The basic version with a short fuselage to carry 20 troops.</p> <p>AS-532 Cougar UL/AL Mk I: This version has an extended fuselage, which allows it to carry 25 troops and more fuel. It is also capable of carrying an external load of 4,500 kg.</p> <p>AS-532 Cougar U2/A2 Mk II: This 1992 version is the longest variant of the Cougar line. It has an improved Spheriflex rotor system with only 4x tail rotor blades, and 2x 2,100-shp Turbomeca Makila 1A2 turboshaft engines that allow an increased cargo carrying capability. It can transport 29 troops or 12 litters, or an external load of 5,000 kg. Primarily used for combat search and rescue, and as an armed version. It may be armed additionally with a 20-mm cannon or pintle-mounted .50 caliber machine guns.</p> </td> </tr> </table>		<p>SYSTEM</p> <p>Alternative Designations: AS 332 Super Puma, SA 330 Puma</p> <p>Date of Introduction: 1981</p> <p>Proliferation: At least 38 countries</p> <p>Description: Variants in “()”</p> <p>Crew: 2 (pilots)</p> <p>Blades:</p> <p> Main rotor: 4</p> <p> Tail rotor: 5, 4 (U2/A2)</p> <p>Engines: 2x 1,877-shp Turbomeca Makila 1A1 turboshaft</p> <p>Weight (kg):</p> <p> Maximum Gross: 9,000 (Mk I), 9,750 (Mk II)</p> <p> Normal Takeoff: 8,600 (Mk I), 9,300 (Mk II)</p> <p> Empty: 4,330 (UC/AC), 4,460 (UL/AL), 4,760 (U2/A2)</p> <p>Speed (km/h):</p> <p> Maximum (level): 275 (Mk I), 325 (Mk II)</p> <p> Cruise: 270</p> <p>Ceiling (m):</p> <p> Service: 4,100</p> <p> Hover (out of ground effect): 1,650 (Mk I), 1,900 (Mk II)</p> <p> Hover (in ground effect): 2,800 (Mk I), 2,540 (Mk II)</p> <p>Vertical Climb Rate (m/s): 7</p> <p>Fuel (liters):</p> <p> Internal: 1,497 (UC/AC), 2,000 (UL/AL), 2,020 (U2/A2)</p> <p> Internal Aux Tank: 475 ea. (4x Mk I, 5x Mk II)</p> <p>Range (km):</p> <p> Normal Load: 620 (UC/AC), 840 (UL/AL), 800 (U2/A2)</p> <p> With Aux Fuel: 1,017 (UC/AC), 1, 245 (UL/AL), 1,176 (U2/A2)</p> <p>Dimensions (m):</p> <p> Length (rotors turning): 18.7-19.5 (U2/A2)</p>	<p>Dimensions continued (m):</p> <p> Length (fuselage): 15.5 (UC/AC), 16.3 (UL/AL), 16.8 (U2/A2)</p> <p> Width: 3.6-3.8 (U2/A2)</p> <p> Height: 4.6</p> <p> Main Rotor Diameter: 15.6-16.2 (U2/A2)</p> <p> Tail Rotor Diameter: 3.1-3.2 (U2/A2)</p> <p>Cargo Compartment Dimensions (m):</p> <p> Floor Length: 6.5 (AC/UC), 6.8 (UL/AL), 7.9 (U2/A2)</p> <p> Width: 1.8</p> <p> Height: 1.5</p> <p>Standard Payload (kg):</p> <p> Internal load: 3,000</p> <p> External on sling only: 4,500</p> <p> Transports 20-29 troops or 6-12 litters (variant dependant), or cargo.</p> <p>Survivability/Countermeasures:</p> <p> Main and tail rotor blades electrically deiced. A radar warning receiver is standard, while a laser warning receiver, missile launch detector, missile approach detector, infrared jammer, decoy launcher, and flare/chaff dispensers are optionally available.</p> <p>ARMAMENT</p> <p> The Mk I variants may employ 2x 7.65-mm machine guns on pintle-mounts in the cabin doors when employed in a transport role.</p> <p>Most Probable Armament</p> <p> The armed versions have side-mounted 20-mm machineguns and/or axial pods fitted with 68-mm rocket launchers.</p> <p>AVIONICS/SENSOR/OPTICS</p> <p>Night/Weather Capabilities:</p> <p> The aircraft is NVG compatible, and through its instruments, avionics, full autopilot, and nav computer, is capable of operation in day, night, and instrument meteorological conditions.</p>
<p>SYSTEM</p> <p>Alternative Designations: AS 332 Super Puma, SA 330 Puma</p> <p>Date of Introduction: 1981</p> <p>Proliferation: At least 38 countries</p> <p>Description: Variants in “()”</p> <p>Crew: 2 (pilots)</p> <p>Blades:</p> <p> Main rotor: 4</p> <p> Tail rotor: 5, 4 (U2/A2)</p> <p>Engines: 2x 1,877-shp Turbomeca Makila 1A1 turboshaft</p> <p>Weight (kg):</p> <p> Maximum Gross: 9,000 (Mk I), 9,750 (Mk II)</p> <p> Normal Takeoff: 8,600 (Mk I), 9,300 (Mk II)</p> <p> Empty: 4,330 (UC/AC), 4,460 (UL/AL), 4,760 (U2/A2)</p> <p>Speed (km/h):</p> <p> Maximum (level): 275 (Mk I), 325 (Mk II)</p> <p> Cruise: 270</p> <p>Ceiling (m):</p> <p> Service: 4,100</p> <p> Hover (out of ground effect): 1,650 (Mk I), 1,900 (Mk II)</p> <p> Hover (in ground effect): 2,800 (Mk I), 2,540 (Mk II)</p> <p>Vertical Climb Rate (m/s): 7</p> <p>Fuel (liters):</p> <p> Internal: 1,497 (UC/AC), 2,000 (UL/AL), 2,020 (U2/A2)</p> <p> Internal Aux Tank: 475 ea. (4x Mk I, 5x Mk II)</p> <p>Range (km):</p> <p> Normal Load: 620 (UC/AC), 840 (UL/AL), 800 (U2/A2)</p> <p> With Aux Fuel: 1,017 (UC/AC), 1, 245 (UL/AL), 1,176 (U2/A2)</p> <p>Dimensions (m):</p> <p> Length (rotors turning): 18.7-19.5 (U2/A2)</p>	<p>Dimensions continued (m):</p> <p> Length (fuselage): 15.5 (UC/AC), 16.3 (UL/AL), 16.8 (U2/A2)</p> <p> Width: 3.6-3.8 (U2/A2)</p> <p> Height: 4.6</p> <p> Main Rotor Diameter: 15.6-16.2 (U2/A2)</p> <p> Tail Rotor Diameter: 3.1-3.2 (U2/A2)</p> <p>Cargo Compartment Dimensions (m):</p> <p> Floor Length: 6.5 (AC/UC), 6.8 (UL/AL), 7.9 (U2/A2)</p> <p> Width: 1.8</p> <p> Height: 1.5</p> <p>Standard Payload (kg):</p> <p> Internal load: 3,000</p> <p> External on sling only: 4,500</p> <p> Transports 20-29 troops or 6-12 litters (variant dependant), or cargo.</p> <p>Survivability/Countermeasures:</p> <p> Main and tail rotor blades electrically deiced. A radar warning receiver is standard, while a laser warning receiver, missile launch detector, missile approach detector, infrared jammer, decoy launcher, and flare/chaff dispensers are optionally available.</p> <p>ARMAMENT</p> <p> The Mk I variants may employ 2x 7.65-mm machine guns on pintle-mounts in the cabin doors when employed in a transport role.</p> <p>Most Probable Armament</p> <p> The armed versions have side-mounted 20-mm machineguns and/or axial pods fitted with 68-mm rocket launchers.</p> <p>AVIONICS/SENSOR/OPTICS</p> <p>Night/Weather Capabilities:</p> <p> The aircraft is NVG compatible, and through its instruments, avionics, full autopilot, and nav computer, is capable of operation in day, night, and instrument meteorological conditions.</p>	<p>VARIANTS</p> <p>SA 330 Puma: Developed in the late 1960s by Aerospatiale in France. Others were built in the UK, Indonesia, Romania.</p> <p>AS 332 Super Puma: Differs from the SA 330 Puma through an improved rotor system, upgraded engines, stretched fuselage, and a modified nose shape.</p> <p>The Cougar name was adopted for all military variants, and in 1990, all Super Puma designations were changed from AS 332 to AS 532 to distinguish between civil and military variants. The “5” denotes military, “A” is armed, “C” is armed-antitank, and “U” is utility. The second letter represents the level of “upgrading”.</p> <p>AS-532 Cougar UC/AC Mk I: The basic version with a short fuselage to carry 20 troops.</p> <p>AS-532 Cougar UL/AL Mk I: This version has an extended fuselage, which allows it to carry 25 troops and more fuel. It is also capable of carrying an external load of 4,500 kg.</p> <p>AS-532 Cougar U2/A2 Mk II: This 1992 version is the longest variant of the Cougar line. It has an improved Spheriflex rotor system with only 4x tail rotor blades, and 2x 2,100-shp Turbomeca Makila 1A2 turboshaft engines that allow an increased cargo carrying capability. It can transport 29 troops or 12 litters, or an external load of 5,000 kg. Primarily used for combat search and rescue, and as an armed version. It may be armed additionally with a 20-mm cannon or pintle-mounted .50 caliber machine guns.</p>		

NOTES

This helicopter is produced by the Eurocopter company. It was formed as a joint venture between Aerospatiale of France, and Daimler-Benz Aerospace of Germany. Additional missions include: VIP transport, electronic warfare, and anti-submarine warfare.

Russian Utility Helicopter Mi-8/HIP

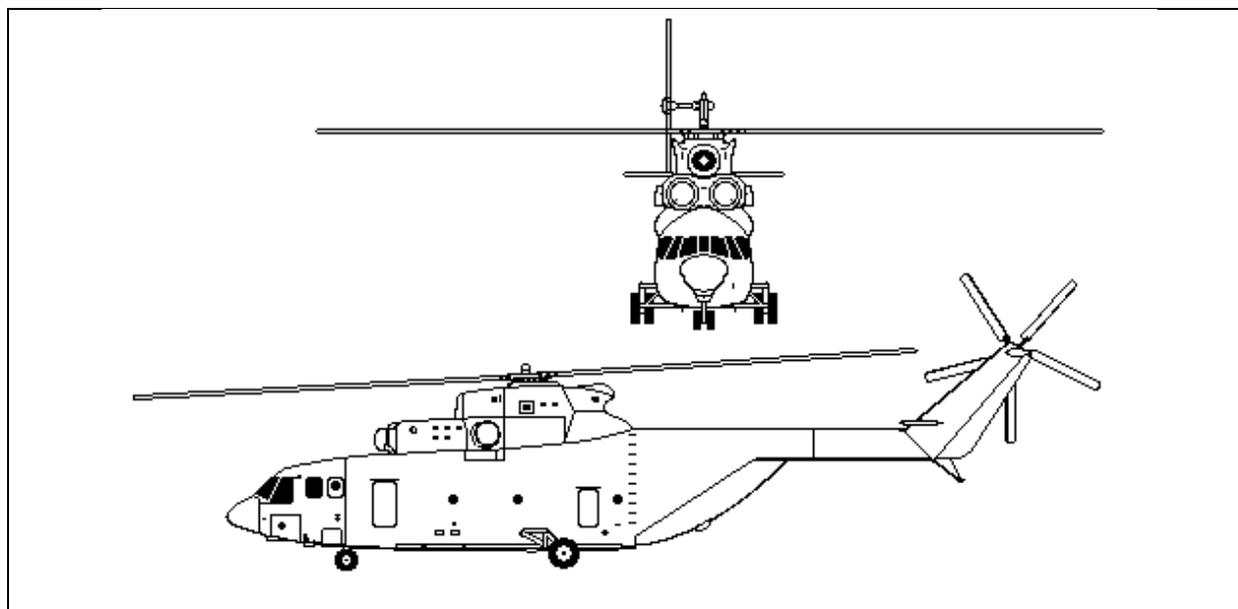
		<p>Weapon & Ammunition Types</p> <p>2x 7.62-mm or 1x 12.7-mm MG</p> <p>Other Loading Options</p> <p>AT-2C or AT-3 ATGMs</p> <p>57-mm rocket pods (16 each)</p> <p>80-mm rocket pods (20 each)</p> <p>250-kg bombs</p> <p>500-kg bombs</p> <p>12.7-mm MG pod</p> <p>Twin 23-mm gun pods</p> <p>Additional fuel tanks (liters)</p>	<p>Combat Load</p> <p>4-6</p> <p>4-6</p> <p>2</p> <p>4</p> <p>2</p> <p>2</p> <p>2</p> <p>1,830</p>
<p>SYSTEM</p> <p>Alternative Designations: INA</p> <p>Date of Introduction: 1967</p> <p>Proliferation: At least 54 countries</p> <p>Description:</p> <p>Crew: 3 (2x pilots, 1x flight engineer)</p> <p>Blades:</p> <p> Main rotor: 5</p> <p> Tail rotor: 3</p> <p>Engines: 2x 1,700-shp Isotov TV2-117A turboshaft</p> <p>Weight (kg):</p> <p> Maximum Gross: 12,000</p> <p> Normal Takeoff: 11,100</p> <p> Empty: 6,990</p> <p>Speed (km/h):</p> <p> Maximum (level): 250</p> <p> Cruise: 225</p> <p>Ceiling (m):</p> <p> Service: 4,500</p> <p> Hover (out of ground effect): 800</p> <p> Hover (in ground effect): 1,900</p> <p>Vertical Climb Rate (m/s): 9</p> <p>Fuel (liters):</p> <p> Internal: 445</p> <p> Internal Aux Tank: 915 ea.</p> <p> External Fuel Tank: 745 in port tank, 680 in starboard tank</p> <p>Range (km):</p> <p> Maximum Load: INA</p> <p> Normal Load: 460</p> <p> With Aux Fuel: 950</p>	<p>Dimensions (m):</p> <p> Length (rotors turning): 25.2</p> <p> Length (fuselage): 18.2</p> <p> Width: 2.5</p> <p> Height: 5.6</p> <p> Main Rotor Diameter: 21.3</p> <p> Tail Rotor Diameter: 3.9</p> <p>Cargo Compartment Dimensions (m):</p> <p> Floor Length: 5.3</p> <p> Width: 2.3</p> <p> Height: 1.8</p> <p>Standard Payload:</p> <p> HIP C: 24 troops, or 3,000 kg internal or external loads on 4x hardpoints.</p> <p> HIP E: 24 troops, or 4,000 kg internal or 3,000 kg external on 6x hardpoints.</p> <p> HIP J/K: antennas on aft section of fuselage.</p> <p>Survivability/Countermeasures:</p> <p>Main and tail rotor blades electrically deiced. Infrared jammer, chaff and flares.</p> <p>ARMAMENT</p> <p>Loaded combat troops can fire personal weapons through windows from inside cabin. The HIP E mounts a flexible 12.7-mm machinegun in the nose.</p> <p>AVIONICS/SENSOR/OPTICS</p> <p>Night/Weather Capabilities:</p> <p>The Mi-8 is equipped with instruments and avionics allowing operation in day, night, and instrument meteorological conditions.</p>	<p>VARIANTS</p> <p>Mi-8T: The HIP C is a medium assault/transport version. The probable armament is 57-mm rockets, bombs, or AT-2C/SWATTER ATGMs.</p> <p>Mi-8VPK: The HIP D is an airborne communications platform with rectangular communication canisters mounted on weapons racks.</p> <p>Mi-8TVK: The HIP E is used as a gunship or direct air support platform. Airframe modifications add 2x external hardpoints for a total of 6, and mount a flexible 12.7-mm machinegun in the nose. The probable armament is 57-mm rockets, bombs, or AT-2/SWATTER ATGMs.</p> <p>Mi-8MT/MTV/MTB/-171-17: The HIP H is an upgraded medium assault/transport version. See separate Mi-17 entry.</p> <p>Mi-8SMV: The HIP J is an airborne jamming platform characterized by small boxes on the left side of the fuselage.</p> <p>Mi-8PPA: The HIP K is an airborne jamming platform characterized by 6x "X"-shaped antennas on the aft fuselage.</p> <p>Mi-9: The HIP G is an airborne command post characterized by antennas, and Doppler radar on tailboom.</p>	

NOTES

Available munitions are shown above; not all may be employed at one time, mission dictates weapon configuration. External stores are mounted on weapons racks on each side of the fuselage. The HIP C has four external hardpoints; the HIP E, HIP H, have six; other variants have none. Interior seats are removable for cargo carrying. The rear clamshell doors open, an internal winch facilitates loading of heavy freight. Floor has tiedown rings throughout. The aircraft carries a rescue hoist capable to 150 kg, and a cargo sling system capable to 3,000 kg. The Mi-8 is capable of single-engine flight in the event of loss of power by one engine (depending on aircraft mission weight) because of an engine load sharing system. If one engine fails, the other engine's output is automatically increased to allow continued flight. See also Mi-17.

Russian Utility Helicopter Mi-17/HIP

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<p>SYSTEM</p> <p>Alternative Designations: INA Date of Introduction: 1983 Proliferation: At least 5 countries</p> <p>Description: Crew: 5 (2x pilots, 1x navigator, 1x flight engineer, 1x loadmaster) Blades: Main rotor: 8 Tail rotor: 5 Engines: 2x 11,400-shp Lotarev D-136 turboshaft Weight (kg): Maximum Gross: 56,000 Normal Takeoff: 49,500 Empty: 28,240 Speed (km/h): Maximum (level): 295 Cruise: 255 Ceiling (m): Service: 4,500 Hover (out of ground effect): 1,800 Hover (in ground effect): 4,500 Vertical Climb Rate: INA</p>	<p>Fuel (liters): Internal: 11,900 Range (km): Maximum Load: 800 Normal Load: INA With Aux Fuel: 1200 km Dimensions (m): Length (rotors turning): 40 Length (fuselage): 33.5 Width: 8.2 Height: 8.1 Main Rotor Diameter: 32 Tail Rotor Diameter: 7.6 Cargo Compartment Dimensions (m): Floor Length: 12 Width: 3.3 Height: variable from 2.9 to 3.2 Standard Payload: Internal or external load: 20,000 kg Transports over 80 troops, 60 litters, or 2x BRDM-2 scout cars, or 2x BMDs, or 1x BMP or, 1x BTR-60/70/80 or, 1x MT-LB.</p> <p>Survivability/Countermeasures: Main and tail rotor blades electrically deiced. Infrared signature suppressors on engines. Infrared jammers and decoys; flares. Self-sealing fuel tanks.</p>	<p>ARMAMENT</p> <p>None</p> <p>AVIONICS/SENSOR/OPTICS</p> <p>Night/Weather Capabilities: The avionics and navigational package, a Doppler weather radar, and a fully functioning autopilot allow for day/night all-weather operation.</p> <p>VARIANTS</p> <p>Mi-26MS: Medical evacuation version. Mi0-26T: Freight transport. Mi-26TZ: Fuel tanker with an additional 14,040 liters of fuel in 4x internal tanks and 1,040 liters of lubricants, pumped through 4x 60-meter long refueling nozzles for refueling aircraft, and 10x 20-meter long hoses for refueling ground vehicles. Fuel transfer rate is 300 liters/minute for aviation fuel, and 75-150 liters/minute for diesel fuel. The refueling system can easily be removed to allow the aircraft to perform transport missions.</p>
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NOTES

The HALO A has no armament. The load and lift capabilities of the aircraft are comparable to the U.S. C-130 Hercules transport aircraft. The length of the landing gear struts can be hydraulically adjusted to facilitate loading through the rear doors. The tailskid is retractable to allow unrestricted approach to the rear clamshell doors and loading ramp. The cargo compartment has two electric winches (each with 2,500 kg capacity) on overhead rails can move loads along the length of the cabin. The cabin floor has rollers and tie-down rings throughout. The HALO has a closed-circuit television system to observe positioning over a sling load, and load operations. The Mi-26 is capable of single-engine flight in the event of loss of power by one engine (depending on aircraft mission weight) because of an engine load sharing system. If one engine fails, the other engine's output is automatically increased to allow continued flight.

Glossary

AA - antiaircraft

acquisition range - sensor range against a category of targets. Targets are usually categorized as infantry, armored vehicles, or aircraft. Acquisition includes four types (or levels of clarity, in ascending order of clarity): detection, classification, recognition, and identification. Where the type of acquisition is not specified, the acquisition range will be regarded as sufficient for accurate targeting. This range is comparable to the former Soviet term *sighting range*.

AAM - air-to-air missile

AGL - automatic grenade launcher

AIFV - airborne infantry fighting vehicle

aka - also known as

antitank - functional area and class of weapons characterized by destruction of tanks. In the modern context, used in this guide, the role has expanded to the larger one of "antiarmor". Systems and munitions employed against light armored vehicles may be included within the category of antitank.

AP - antipersonnel

APE - armor-piercing explosive (ammunition)

APC - armored personnel carrier

APC-T - armor-piercing capped tracer (ammunition)

AP HE - armor-piercing high explosive (ammunition)

API-T - armor-piercing incendiary tracer (ammunition)

APERS-T - antipersonnel tracer (ammunition)

APT - armor-piercing tracer (ammunition)

APU - auxiliary power unit; auxiliary propulsion unit

ASM - air-to-surface missile

AT - antitank

ATGL - antitank grenade launcher

ATGM - antitank guided missile

average cross-country (speed) - vehicle speed (km/hr) on unimproved terrain without a road.

burst (rate of fire) - artillery term: the greatest number of rounds that can be fired in 1 minute.

caliber - munition diameter (mm or inches), used to classify munition sizes; barrel length of a cannon (howitzer or gun), measured from the face of the breech recess to the muzzle.

canister - close-range direct-fire ammunition which dispenses a fan of flechettes forward

CC - cargo-carrying (ammunition)

CCM - counter-countermeasure

CE - chemical energy: the class of ammunition which employs a shaped charge for the lethal mechanism. Ammunition types which employ CE include HEAT and HESH (see below).

CM - countermeasure

coax - coaxial

CRV - combat reconnaissance vehicle

cyclic (rate of fire) - maximum rate of fire for an automatic weapon (in rd/min)

Worldwide Equipment Guide

decon - decontamination

direct-fire range - maximum range of a weapon, operated in the direct-fire mode, at which the bullet's trajectory will not rise above the height of the intended point of impact on the target. At this range, the gunner is not required to adjust for range in order to aim the weapon. The comparable Russian term is *point blank range*.

DPICM - dual-purpose improved conventional munitions (ammunition)

DPICM-BB - dual-purpose improved conventional munitions, base-bleed (ammunition)

DU - depleted uranium (ammunition)

DVO - direct-view optics

ECM - electronic countermeasures

EO - electro-optic, electro-optical

ERA - explosive reactive armor

ERFB - extended range full-bore (ammunition)

ERFB-BB - extended range full-bore, base-bleed (ammunition)

est - estimate

ET - electronic timing (ammunition fuze type)

European - from a consortium of firms located or headquartered in several European countries

FAE - fuel-air explosive (ammunition). This munition technology is employed in aerial bombs and artillery munitions, and uses a dispersing explosive fill to produce intense heat, a long-duration high-pressure wave, and increased HE blast area

FCS - fire control system

FFAR - folding-fin aerial rockets

flechette - former-Soviet artillery ammunition which dispenses flechettes forward over a wide area. Unlike **canister rounds**, these rounds use a time fuze, which permits close-in direct fire, long-range direct fire, and indirect fire.

FLIR - forward-looking infrared (thermal sensor)

FLOT - forward line of own troops

FOV - field of view

frag-HE - fragmentation-high explosive (ammunition)

FSU - former Soviet Union

gen - generation. Equipment such as APS and (thermal and II) night sights are often categorized in terms of 1st, 2nd or 3rd generation of development, with different capabilities for each.

GP MG - general purpose machinegun

GPS - global positioning system

HE - high explosive (ammunition)

HEAT - high-explosive antitank (also referred to as shaped-charge ammunition)

HEAT-FS - high-explosive antitank, fin-stabilized (ammunition)

HEAT-MP - high-explosive antitank, multi-purpose

HEFI - high-explosive fragmentation incendiary (ammunition)

HEI - high-explosive incendiary (ammunition)

HEP-T - high explosive plastic-tracer (ammunition)

HESH - high-explosive squash head (ammunition)
HUD - head-up display
HVAP-T - hypervelocity, armor-piercing tracer (ammunition)

I-T - incendiary - tracer (ammunition)
IFF - identification friend-or-foe
IFV - infantry fighting vehicle
II - image intensification (night sighting system)
ILS - instrument landing system
INA - information not available
IR - infrared

K-kill - catastrophic kill (simulation lethality data)
KE - kinetic energy: class of ammunition which transfers energy to the target for the lethal mechanism. Ammunition types which employ KE include AP, APFSDS-T, and HVAP-T.

LAFV - light armored fighting vehicle
LLLTV - low-light-level television
LMG - light machinegun
LRF - laser rangefinder

max - maximum

maximum aimed range - maximum range of a weapon (based on firing system, mount, and sights) for a given round of ammunition, while aiming at a ground target or target set with sights in the direct-fire mode. The range is not based on single-shot hit probability on a point target, rather on tactical guidance for firing multiple rounds if necessary to achieve a desired lethality effect. One writer referred to this as *range with the direct laying sight*. Even greater ranges were cited for *salvo fire*, wherein multiple weapons (e.g., tank platoon) will fire a salvo against a point target.

max effective range - maximum range at which a weapon may be expected to achieve a high single-shot probability of hit (50%) and a required level of destruction against assigned targets. This figure may vary for each specific munition and by type of target (such as infantry, armored vehicles, or aircraft).

max off-road (speed) - vehicle speed (km/hr) on dirt roads.

MCLOS - manual command-to-line-of-sight

MG - machinegun

Mk - Mark

MRL - multiple rocket launcher

N/A - not applicable

NBC - nuclear, biological, and chemical

Nd - neodymium, type of laser rangefinder

NFI - no further information

normal (rate of fire) - artillery term: rate (in rd/min) for fires over a 5-minute period.

NVG - night-vision goggle

NVS - night-vision system

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PD - point-detonating (ammunition fuze type)

Ph - probability of hit (simulation lethality data)

PIBD - point-initiating base-detonating (ammunition fuze type)

pintel - post attached to a firing point or vehicle, used to replace the base for a weapon mount

Pk - probability of kill (simulation lethality data)

practical (rate of fire) - maximum rate of fire for sustained aimed weapon fire against point targets. The rate includes reload time and reduced rate to avoid damage from overuse. Former Soviet writings also refer to this as the **technical rate of fire**.

recon - reconnaissance

Rd - round

ready rounds - rounds available for use on a weapon, whether in autoloader or in nearby stowage, which can be loaded within the weapon's stated rate of fire.

RF - radio frequency

RHA - rolled homogeneous armor, often used as a standard armor hardness for measuring penetration of anti-tank munitions.

RHAe - RHA equivalent, a standard used for measuring penetrations against various type armors

SACLOS - semiautomatic command-to-line-of-sight

SAM - surface-to-air missile

SP - self-propelled

stadimetric - in this guide, a method of range-finding using stadia line intervals in sights and target size within those lines to estimate target range.

stowed rounds - rounds available for use on a weapon, but stowed and requiring a delay greater than that for ready rounds (and cannot be loaded within the weapon's stated rate of fire).

sustained (rate of fire) - artillery term: rate (in rd/min) for fires over the duration of an hour.

tactical AA range - maximum targeting range against aerial targets, aka: **slant range**.

TAR - target acquisition radar

TELAR - transporter-erector-launcher and radar

thermobaric - HEI volumetric (blast effect) explosive technology similar to fuel-air explosive and used in shoulder-fired infantry weapons and ATGMs.

TLAR - transporter-launcher and radar

TOF - time of flight (seconds)

TTP - tactics, techniques, and procedures

TTR - target tracking radar

UI - unidentified

VEESS - vehicle engine exhaust smoke system

vs - versus

w/ - with (followed by associated item)

WP - white phosphorus (ammunition)